

Chemicals, Environment, Health

A Global Management Perspective



Edited by
Philip Wexler ♦ Jan van der Kolk
Asish Mohapatra ♦ Ravi Agarwal



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For my parents (Yetty and Will), my son (Jacob), and dear Nancy

Philip Wexler

*For my wife, Jeanette, who accompanied me in many ways during a
40 year journey promoting chemical safety*

Jan van der Kolk

For my loving wife, Sarah, my Mom (Kanak) and Dad (Mahendra)

Asish Mohapatra

To my father

Ravi Agarwal

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Foreword

The past 40 years have seen a phenomenal growth in globally oriented public and private initiatives related to chemical and other environmental issues. The groundbreaking 1972 United Nations Conference on the Human Environment held in Stockholm, in which I was honored to play a role, ushered in a veritable sea change in international environmental policies. It gave rise to the first World Environment Day and the creation of the United Nations Environment Programme. It put the environment on the international agenda as a global concern, which must be and could be reconciled with economic development as two sides of the same coin. This led the way to the acknowledgment that sustainable development is the most logical and viable pathway to the human future.

Over the years, one conference, or rather milestone, led to another—Stockholm to Rio to Johannesburg—with many intervening activities. Stakeholders who played an influential though limited role in 1972 from outside of the Conference were brought into the fold to offer their unique perspectives. The developing world, which suffered most from environmental degradation, yet did not have the resources to ameliorate it, asserted its insistence that more developed countries provide the new and additional resources they would need to address their environmental problems. Although steps have been taken, the ever widening gap between South and North has still to be successfully addressed. By many measures, we are better off than we were in 1972. With more emerging issues, such as new technologies, and much greater knowledge, formidable challenges remain. What is most important is that the dialogue has been established, is continuing and mechanisms have been created that contribute to solutions of many problems. Governance has now also become a subject in its own right, as critical to many successful approaches. So are linkages between chemicals management and other health and environmental problems. Indeed, on an even broader level, so is the concept of environmental mainstreaming, in which considerations about the environment (including chemicals) are integrated fully into decision making in the economic, social, and physical realms of development.

The very capable editors of this book have assembled a distinguished roster of contributors to create a valuable guidebook to global chemicals management cooperation as it stands today and is projected to evolve in the future. An opening background chapter setting the historical and contextual framework is followed by chapters covering the major conferences, international treaties and conventions, and organizations. Select regional and national activities round out the scope of the book. Invited essays in such diverse areas as emergencies, information resources, global financial instruments, and governance further supplement the core text. Naturally, today's major policy framework, the Strategic Approach to International Chemicals Management (SAICM) and its associated International Conference on Chemicals Management (ICCM), are also highlighted. Finally, a concluding chapter analytically presents a look at the future of global chemicals policy.

This is not the first book to consider chemicals, environment, and health from a global perspective, but it is the first to do it so thoroughly and concisely, without getting bogged down in a litany of legalistic detail. The chapters consistently offer precision, perspective, and reflection, and will be appreciated not only by the professional policy community, but to anyone wanting a clear look through the complex maze. I applaud this contribution to global environmental knowledge and understanding, and appreciate the opportunity to introduce it to both experienced hands at the subject and the new generation of researchers and practitioners. It is a book to read straight through or savor a section at a time, and belongs on the bookshelf of anyone interested in making a difference in the way we and future generations will live our lives in a world in which our health, and the environments, will no longer be endangered by potentially hazardous chemicals at any stage of their life cycle.

Maurice F. Strong

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Maurice F. Strong has had a remarkable career in both business and public service, primarily in the fields of international development, the environment, energy and finance. He has played a unique and pioneering role in globalization of the environment movement as Secretary-General of both the 1972 United Nations Conference on the Human Environment, which first put the environment on the international agenda, and the 1992 Rio Earth Summit. He was the first Executive Director of the United Nations Environment Programme. Strong continues to be active in environment and related fields, particularly in China (a country he has had a long relationship with and where he now spends much of his time). To learn more about Maurice Strong's illustrious career, visit <http://www.mauricestrong.net>.

Preface

INTRODUCTION

Chemicals are ubiquitous. Man has been aware of naturally derived chemicals for thousands of years, while synthetic chemicals have been with us for perhaps 200 years, with both performing a variety of important functions in our lives.

The toxicity of certain chemicals to man and animals has also been known since antiquity.

Chemical industry as producer of many new molecules for different purposes is however, relatively young, a little more than a century. In that period of time, the number of new molecules and the volumes of their production have increased tremendously. With more than 56 million organic and inorganic chemicals registered with the Chemical Abstracts Services of the American Chemical Society as of late 2010, and nearly 100,000 in commerce, they are having an increasingly huge impact on our lives.

AWARENESS

With this rapid growth in chemical synthesis, distribution, use, and subsequent exposure, society eventually realized the need to manage chemicals in a sound way, albeit often with delays. The need to protect workers, globally, from potentially harmful effects began as early as 1921 with the ILO (International Labour Organization) Convention to ban white lead in most paints. This convention subsequently proved to be beneficial for the larger population groups (e.g., countries that had implemented this Convention had hardly any problems with children affected by white lead from paint indoors).

As a class of chemicals, pharmaceuticals were subject to early regulatory controls, long after it became clear that the same substances that could cure illnesses could also be toxic for the patient.

Pesticides were another group to receive wider attention, both to assure that their beneficial effects were optimized and to control unwanted side effects. For example, in the United States, the Pure Food and Drugs Act and the Federal Insecticide Act were passed in 1906 and 1910 respectively. In fact, many early regulations, including those for foodstuffs, pharmaceuticals, and pesticides, centered first on quality and later on safety. Pesticide regulations were introduced in many countries in the first half of the twentieth century. The awareness of the potentially harmful effects of chemicals, particularly pesticides on the environment reached, in a sense, its watershed moment soon after the publication of Rachel Carson's *Silent Spring* in 1962.

Further efforts to control worker exposure to hazardous industrial chemicals started in the mid-1960s. These resulted in schemes for classification and labeling, as well as regulations for transport, to prevent accidents.

The 1960s witnessed a number of environmental problems traceable to chemical waste. One of the most well known is the Love Canal site in the United States. Later, many thousands of heavily contaminated sites were discovered. In the Netherlands, entire urban areas were destroyed in the 1970s after it had become clear that houses had been built on a previous chemical waste dump. In the same decade, numerous instances were uncovered of contaminated sites in developing countries. These were due to dumping of chemical and pesticide waste and/or the uncontrolled import of chemical waste.

MANAGEMENT, INSTRUMENTS, AND CHALLENGES

International attempts to address chemical safety could be said to truly begin with the 1972 Stockholm Conference, which resulted in the creation of UNEP (United Nations Environment Programme) and, shortly thereafter, the predecessor of what is today UNEP Chemicals.

Since this Conference, and in particular since the UNCED (United Nations Conference on the Environment and Development) in 1992 in Rio de Janeiro, many initiatives have been undertaken to address the potentially harmful effects of chemicals. Most recently, in 2002, in Johannesburg, South Africa, the World Summit on Sustainable Development, building upon the Rio conference, articulated the often cited goal of ensuring that chemicals are produced and used in ways that minimize significant adverse impacts on the environment and human health.

This book seeks to give a full overview of these developments and their impacts at international, and select regional and national levels. Further, it offers an outlook for the next 5–10 years—specifically, of the current challenges that need to be addressed to meet the goals that the international community set in Johannesburg in 2002.

The United Nations will be holding another conference on sustainable development in Rio in May 2012, 20 years after the historic 1992 conference, and thus already being informally referred to as Rio + 20. The conference will seek three objectives: securing renewed political commitment to sustainable development, assessing the progress and implementation gap in meeting already agreed commitments, and addressing new and emerging challenges. The members have agreed to the following two themes: green economy within the context of sustainable development, and poverty eradication, and institutional framework for sustainable development.

INTEGRATION OF CHEMICALS IN WIDER SUSTAINABLE DEVELOPMENT

Chemicals are but one, albeit important, topic on the international environment and health agenda. However, they touch upon a host of other issues of critical importance to health and the environment: climate change (several chemicals are important contributors to global warming or the depletion of the ozone layer), biological diversity (certain chemicals are known to affect ecosystems in various regions of the world),

transmissible diseases (consider the continuing debate of the role of certain pesticides in malaria control), poisoning incidents (most cases of poisoning worldwide are attributed to abuses of pesticides). In this sense, almost all the Millennium Development Goals, established by the United Nations, with a target date of 2015, have a direct or indirect link with chemicals management. To cover all these, though, would take several more volumes.

Several key lessons have gradually been learned over the years.

First, many instruments have developed separately and without much coordination. This has significantly complicated work both at international and national levels. Only recently, attempts to streamline have resulted in more concrete and integrated actions (i.e., enhancing synergies between the Basel, Rotterdam, and Stockholm Conventions). Much work still remains to be done in this area.

Second, chemicals management and its instruments have mostly been looked at as a technical and specialized niche area, somehow removed from other societal concerns. This, notwithstanding the key importance of chemicals and chemistry for all areas of the economy and development, and the scientifically indisputable negative effects of several dozen chemicals on health or the environment worldwide. Very few attempts have been made to link chemicals management to the wider sustainable development agenda, or to broader mechanisms, including financial instruments, or development planning in general.

This book addresses not only the individual instruments and their implementation in several regions and countries, but also underpins the need for such further integration.

OVERVIEW

Since the 1972 Stockholm Conference, a number of books, papers, and monographs have discussed problems and situations related to chemicals management. These publications have largely dealt with key issues as seen from a specific perspective.

This book is the first to bring together, in a cohesive manner, history, legal and other instruments, roles of international organizations, capacity strengthening initiatives, and accomplishments at all governmental levels.

Philip Wexler
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Editors

Philip Wexler is a Technical Information Specialist at the National Library of Medicine's (NLM's) Toxicology and Environmental Health Information Program. He is the federal liaison for the Toxicology Education Foundation and the World Library of Toxicology. He coordinates and manages NLM's risk-assessment information databases and online tools on the TOXNET system, and is project manager of the LactMed file on drugs and lactation. He is team leader for the development of the ToxLearn online tutorials, a joint activity with the U.S. Society of Toxicology (SOT). Served as chair, for two years, of SOT World Wide Web Advisory Team, he is President of the Society's Ethical, Legal, and Social Issues Specialty Section in 2009–2010. He has coorganized the Toxicology History Room for a variety of professional meetings. He was a member of the Education and Communications Work Group of the CDC/ATSDR's National Conversation on Public Health and Chemical Exposure project. Wexler has published numerous papers on toxicology information and has lectured and taught widely on the subject in the United States and abroad. He is editor-in-chief of the *Encyclopedia of Toxicology*, 2nd edition, 2005, with a third edition in progress, and *Information Resources in Toxicology*, 4th edition, 2009, both published by Elsevier Science. He is currently working on a major review article on toxicology informatics for *Critical Reviews in Toxicology*. He is the recipient of the SOT's 2010 Public Communications Award.

Jan van der Kolk has a background in chemistry and microbiology. He served as deputy director of Environmental Health in the Ministry of Environment of the Netherlands until 2005. Since, he has been working as an independent expert, under the company named Eco Conseil, mainly in the field of implementing International Environmental Agreements, mostly in countries of Africa, Asia, and the Caribbean. He has worked extensively with the European Union and most international organizations that have programs for the sound management of chemicals (WHO, FAO, UNEP, UNITAR, OECD) and pesticides. He was one of the founding fathers of UNEP Chemicals. He has been chair of the Codex Committee on Pesticides Residues, under the Codex Alimentarius Commission and of the Working Group on Pesticides of the OECD. He was an initiator of the review of the European Chemicals Management rules, which ultimately resulted in the REACH regulation.

Asish Mohapatra is a health risk assessment and toxicology specialist for Health Canada (Alberta/Northern Region) Environmental Health Program (contaminated sites). He has 15 years of experience in the public and private sectors in the areas of life sciences, environmental public health sciences, chemical and computational toxicology, health risk-assessment and management, and environmental management. He has postgraduate and predoctoral degrees in life sciences (toxicology) and environmental sciences (industrial toxicology and hemato-toxicology), respectively. He has extensively reviewed and analyzed projects on chemical risk assessment and

management, and numerous human health risk-assessments and management projects. He has also reviewed several environmental impact-assessment projects related to air, soil and groundwater, biotic effects and community health-assessment issues around residential, commercial, and industrial contaminated sites. Additionally, he has conducted critical reviews of air, water and soil toxicology, indoor and outdoor air quality health effects assessment and dynamics, and exposure analysis and health risks from everyday exposure to emerging physical, chemical, biological, and psychosocial stressors. He has conducted uncertainty analysis, quantitative risk-assessment modeling, and toxicological evaluations of petroleum, chlorinated, and polyaromatic hydrocarbons. He has been evaluating existing and emerging tools and computational technologies (e.g., semantic Web informatics, data fusion tools) to effectively use them to analyze, interpret, disseminate, and share toxicological and health risk-assessment data from disparate sources under public health toxicology and risk-assessment frameworks.

Ravi Agarwal is founder director of Toxics Link, a key environmental NGO located in New Delhi and working on issues of chemical safety and waste for more than 15 years. A Communications Engineer by training, he pioneered public advocacy based work in this area, after more than 15 years of professional experience as an entrepreneur and engineer. He has been part of several policy and legislative processes in India as member of Standards Expert Groups on Biomedical Waste, Hazardous Waste technologies, Plastics Waste management, amongst others. He has lectured extensively on chemical safety issues besides helping in on the ground initiatives as well as the formulation of new policy. He has written widely on these issues, both in journals as well as in the popular media. Internationally he has worked closely with agencies like WHO and UNEP for initiatives on hazardous waste trade, mercury, technological options for biomedical waste treatment, and lead in paints. He has participated as an NGO representative in the formulation of several International multilateral treaty processes, including the Stockholm Convention on POPs, the Basel Convention, the SAICM process, as well as the ongoing intergovernmental negotiations for a Mercury Treaty. He is an Executive Board member of the International POPs Elimination Network (IPEN), a global network with over 600 members mostly from the global south as its Treasurer, besides being a Steering Committee member, and has been a member of the Zero Mercury Working Group, and the Basel Action Network since their inception. He was the first India chair of the Global Greengrants Foundation, and initiated the Environmental Equity and Justice Partnership fund in India to support grassroots work on chemical safety. He was awarded the IFCS–WHO Special Recognition Award for Chemical Safety in 2008 and the Ashoka Fellowship in 1998.

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Section I

The Context

1 Creating and Controlling Chemical Hazards

A Brief History

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OVERVIEW

We live in a thoroughly chemical world. Chemicals, quite literally, comprise everything. This has always been the case, but perhaps now we are more in touch with this fact than at any previous time in human history. This is due, in part, to our increasing ability to exert influence over the chemicals available in the world, and even more powerfully, to put new chemicals of our own making into that world. Thus the knowledge of and presumed control over chemicals has created a moment in which we feel as though we have finally mastered our environment. But if the uniqueness of this moment results in part from this new-found creative power, it is equally due to our developing comprehension of how well we understand the consequences of those actions. Molecules produced decades ago, whose production has long since ceased, continue to pervade our environments and our bodies. Compounds created in one hemisphere travel the ecological currents to arrive unannounced in distant places. Entirely new vocabularies have been invented in recent years just to begin accounting for all of the new things we now know and to mark the places of the things we still do not. These new words—biopersistence, bioaccumulation, endocrine disruption, chemical mutagenesis, toxicogenomics, and nanotoxicology—stand as historical

markers of our time. A century ago, a scientist would have had no understanding of, let alone familiarity with, a word like bioaccumulation not simply because of a lack of knowledge but because of an entirely different conceptual framework for thinking through the risks posed by chemicals to organisms and their environments. Just as our understanding of chemistry has evolved over the centuries (perhaps millennia, if we consider activities that existed long before the word chemistry ever appeared), so too have our understandings of the interrelations between chemicals, our environment, and our health.

Despite an increased appreciation of the hazards (and our lack of knowledge about them) posed by some chemicals, production grows. Each year, we produce more chemicals than in the previous year. We continue to invent new chemicals. And we create altogether new methods for creating these new chemicals. Our creative pursuits generally far outpace our efforts to fully understand these new substances or to control them adequately. The evolution of chemistry is also then an evolution of the means by which we seek to control, or “manage,” the risks and harms associated with the development, use, and disposal of these molecules.

This brief introductory chapter, which explores the development of new tools and efforts to understand the intimate link between our chemical pursuits and the risks that emerge to humans and our environment, will be positioned in relatively long historical context. Indeed, it is an impossibly long history given the brevity of the narrative here. But given the context of this volume, it might be useful to appreciate the ways in which humans have dealt with the consequences of chemical adventures and resulting exposures.

ANCIENT ROOTS/ROUTES

While we are accustomed to thinking about our physical experience of the world, and navigating the dangers it poses to us, we are less familiar with thinking about the ways in which our chemical bodies come into intimate daily chemical contact with the world. With each breath, each gulp of drink, and each mouthful of food, molecules from “outside” come “inside” where simple, fundamental, but potentially risky reactions take place. While our understanding of these interactions has become more sophisticated through the development of chemistry, toxicology, pharmacology, and the like, human interest in navigating these risky interactions is as old as the species itself (if only because every organism, in order to survive, must find a way to safely interact with the world).

Foraging, farming, and herding—all early forms of procuring food—are sophisticated ways of sorting things out; we organize into groups, things that are safe to eat and keep them separate from things that are not. These safeguards become more elaborate when we include systems of food preparation and consumption. The anthropologist Mary Douglas demonstrates the simple, common, beauty in these systems, which cross cultures (Douglas, 1966; see also Douglas and Wildavsky, 1980). It is important to keep the clean separate from the unclean; the pure away from the impure. It would be anachronistic and reductionist to read these stories of sorting, classifying, and organizing, as simply tales of navigating risks of our chemical environment. But it would also be naïve to ignore these ancient roots to

our species' need to develop simple systems for protecting ourselves from our living environment.

FROM HARVESTING TO PERFECTING POISONS

Knowing which plants or parts of animals are healthful or harmful allows one to enjoy those elements of the world that will help one to thrive while avoiding those that will cause harm. It also means that one can more purposefully harness those ingredients which can harm others (or oneself should one so chose). As this knowledge became more sophisticated and more specialized, fewer people could be entrusted with it. It is from this situation that we see the emergence of perhaps the first in the lineage that will eventually become our modern chemists, toxicologists, or pharmacologists: the herbalist.

In the figure of the herbalist, we have someone who represents specialized knowledge of the world for treatment of maladies, boosting health, and when necessary providing forms of nature's poisons. Interestingly, the herbalist is a figure that spans cultures even if the person goes by different names in those traditions. Despite geographic and cultural distance, their prominent traits are amazingly similar. And, indeed, so is the knowledge held by this person, which is perhaps one reason this person has endured to become a contemporary of the modern day scientist. This person continues to be an important one for helping us to navigate through the world safely. Although the practice cannot be said to be rooted in chemistry explicitly (especially for those traditions that exist within a very different picture of the human body), herbal treatments of many kinds for everyday problems easily move into the domain of the molecular sciences when the door is opened for them (as is evidenced in the adoption of many "alternative" therapies).

Chemistry is as much practice as it is theory. Here again we have links between past and present. The herbalist embodies knowledge not just of the world, but of how to prepare the world for proper human consumption. Crucial elements are extracted and distilled from their natural reservoirs. Treatments are prepared with mortar and pestle into powders, pastes, and pills. If specific knowledge of the world does not provide a link between these traditions, than surely the practices and material culture do.

THE PROTO CHEMISTS

It is at this point in our history that our *protochemists* emerge: the alchemist, the iatrochemist, and the metallurgist (Brock, 1992). The beauty of these professions is that they span the globe, demonstrating the multiple ways in which the chemical sciences developed in different corners of the world, and that they are all thoroughly hands-on activities, which emphasizes the ways in which manipulation of matter and substance have been at the root of this long tradition. Yet, despite their similarities, these three practices possess their own unique attributes.

The alchemist has emerged from history as the storied predecessor to today's chemist. Shrouded in mystery (and often depicted in paintings working in darkness), we have embraced the idea of the solitary scholar, probing the depths of the

universe for ways to unlock the secrets of matter. What we often forget (or ignore) are the ways in which these individuals developed sophisticated means for notation, cataloging substances and reactions, and tools of the trade that long outlived the figure of the alchemist. The iatrochemist is to the apothecary what the alchemist is to the chemist, but with less intrigue. These figures developed skills that would give rise to fields more closely aligned with pharmacy and toxicology. Indeed, it was the iatrochemist Theophrastus Bombastus von Hoenheim, otherwise known as Paracelsus, who famously offered the dictum that the dose makes the poison, which has lived as the mantra (for better or for worse) of modern day toxicology.* The insight captured in this lesson, offered in defense of his seemingly unorthodox practices, highlight a key moment in understanding relationships between health, disease, and yet to be articulated chemical interventions. The metallurgist/smelter completes this triumvirate. Many of these practices have a lineage longer than that of recorded history, but they found new expression and new appreciation around the same time as the alchemists and iatrochemists entered the scene. Smelting and the working of ores distinguished cultures around the globe, especially those in the modern day Middle East. Indeed, legendary Damascus Steel, characterized by unsurpassed strength, is considered by many to be perhaps the earliest material to be embedded with a nano-sized microstructure. With the publication of Agricola's *De Re Metallica*, the mining and smelting trades became more tightly interwoven with the other emerging molecular sciences.

These practices, however, had other consequences as well. As the scale of mining and metal working increased in scope and scale, so too did the hazards of the job. Mine tailings and contact with heavy metals extracted during ore processing increased. Unique diseases associated with mining surfaced along with these precious raw materials. Signs of asbestosis and silicosis were already recognizable in the eighteenth and nineteenth centuries (Markowitz and Rosner, 2002; Michaels, 2008; Rosner and Markowitz, 1994). The ailments suffered by coal miners were well recognized, if not entirely understood. The relationship between mining and disease generated a pattern that would later be recognized as the basis of vastly different disorders, but all linked to the common problem of occupational exposure.

Increased availability of these substances also meant that they were finding new (or expanded) uses. Drawing on knowledge from previous traditions, the use of heavy metals for medical purposes, such as the application of mercury to treat venereal diseases, continued to grow. Mercury was also famously used by hatters to stiffen the felt being used. Lead found wide application in pigments and pipes. This, despite the long history of lead poisoning dating back at least to the Roman Empire and stretching across the centuries when lead was used for almost everything, from building water transport infrastructures and preserving wine (Warren, 2001). Perhaps amazingly, many of these practices continued unabated into the twentieth century (Markowitz and Rosner, 2002).

* The full quote reads: "All things are poison, and nothing is without poison: the *Dosis* alone makes a thing not poison," taken from *The Reply to Certain Culminations of His Enemies (Seven Defensiones)* (Paracelsus 1996 (1941), p. 22).

A “CHEMICAL” REVOLUTION

The “Chemical Revolution” of the late eighteenth century is typically categorized as a theoretical debate, one pitting Georg Stahl’s theory of phlogiston versus Antoine Lavoisier’s new theory of oxygen (Brock, 1992). Stahl’s ideas about why materials could burn, due to the phlogiston contained within, were seen to be out of step with new Lavoisier’s experiments. The story, of course, is more complicated than that and it has within it the seeds of other revolutions. Lavoisier’s theory of oxygen was given greater countenance and strength because of two additional key components: the broad new system within which Lavoisier placed oxygen and tools by which he demonstrated, defended, and propagated his new theories (Kim, 2003; Levere, 2001).

Lavoisier’s chemistry introduced a new way of understanding chemical reactions, which allowed for a more complex set of reactions to be possible and to account for those reactants and products. Equally important were Lavoisier’s contributions to the practice of chemistry and the development of tools for quantifying chemical reactions. This early work, quickly adopted in Germany and more slowly in Britain, laid a foundation for thinking differently about how chemical species interact with one another, and how they might be analyzed. Methods for analyzing complex organic liquids and gases which developed over the succeeding generation, created new methods that would find application in agricultural as well as pharmaceutical settings. Thus, the chemical revolution was at least as important for its analytical breakthroughs as it was for its theoretical reframing of the chemical sciences.

BIRTH OF AN INDUSTRY

The nineteenth century’s industrial revolution was not isolated to the development of motion and mechanisms. It was also a time when chemistry became the basis for a brand new industry. Chemists were already busy at work linking their laboratories with farm fields (Brock, 1992). But the creation of a new color dye, mauve, from coal tar extracts in the laboratory of Charles Perkins, marks a change in the ways in which chemistry and industry coexisted—and it marks an important moment for occupational and environmental toxicology (Garfield, 2001; Travis, 1993).

Perkins’ creation of the first synthetic dye, and its quick application to commercial industries, precipitated a race among chemical powerhouses across Europe in search of other dyes that may be hidden in coal waste (Travis, 1993). Understanding why these particular compounds acted as dyes was secondary to finding more of them. This model of innovation, search first and understand later, arguably guided the chemical industry through the twentieth century. Of course, what made Perkin’s molecule display such brilliant colors was the abundance of conjugated bonds available in the aromatic compounds that would come to characterize the azo dyes. While Perkin isolated the first of these compounds and put it to commercial use, it was the Germans who created an industry around these organic dyes. Work done with these organic compounds helped to make Germany a leader in industrial chemistry. It also made it a site for the emerging fields of occupational health and exposure.

Before the century’s end, solid links had been established between worker exposure in the dye industry and the development of rare cancers. Unions representing

workers in these new industries worked with their own medical and health professionals to document these cases. But knowledge of the practice of organic chemistry and knowledge of the effects these practices might have in occupational settings did not travel at the same rate. While Europe gathered experience and knowledge in both of these domains, less-developed chemical industries, like those in the United States, gathered unequal bits of information from across the ocean (Michaels, 2008).

THE WAR YEARS

The onset of war in the twentieth century altered this landscape more rapidly and more dramatically than at any previous time in this history. The geopolitics of the chemical industry shifted as Europe fell into ruin and the United States collected and exploited the spoils of war (in the form of patents and other trade secrets). Chemicals became the basis for new industries, new weapons, and new materials. And knowledge of and around the toxicity of these materials expanded as these toxic properties were sought out purposefully to combat foes, both domestic and foreign.

With world war erupting in the second decade of the twentieth century, radical changes to industrial infrastructure were required to keep the war machine running. Global supply chains were being severed. Coupled with increased strain on raw materials pressure increased on chemists to find suitable synthetic alternatives for crucial materials and processes. Perhaps the most important of these was the development of the Haber–Bosch process for the synthesis of ammonia (Smil, 2004). If the Haber–Bosch process was the most important breakthrough in those early years of war, then Fritz Haber’s transformation of chlorine gas into a weapon of war was the most infamous (Russell, 2001). Haber’s contributions made him a national hero in Germany. For the countries that witnessed the events at Ypres where French soldiers were gassed in their trenches, the future was being written. Countries such as the United States quickly mobilized academic chemists through their Chemical Warfare Service to begin research and development of new potential chemical weapons (Russell, 2001). The first of the World Wars ended before these tools could be put to use, but the knowledge gleaned from the process proved invaluable. With the end of the war came the spreading of its spoils; in this case, the patents that had made the chemical industry in Germany the dominant figure globally. The budding chemical industry in the United States now had practical experience of their own garnered during the war and the patents of its German rivals. All that was needed was sustained support from the U.S. government to maintain the research initiatives begun during the war.

The industry did succeed in keeping money flowing for research by, in part, coupling research for chemical weapons into research on new pesticides (Russell, 2001). As the historian Ed Russell uncovers, the similarities in projects were more than coincidental. More often than not, a bad chemical weapon made for a good pesticide, and vice versa. Additionally, the support technologies would be remarkably similar—one could simultaneously prepare for dusting fields and trenches. In the case of pesticides, the model for innovation was a bit different than what emerged with synthetic dyes. Preparing poisons meant also wanting to understand what would be poisonous and why. If efficiency and potency were not motives, then the understanding that we would likely need to protect our own soldiers proved enough to begin more

serious toxicity testing. And so with the rise of more potent poisons between the wars also came a parallel effort that would provide the basis for our understanding of the toxicity of these materials.

As was the case in the World War I, these chemical concoctions devised during the interwar period never made it to the battle field when war broke out again. And so as with many wartime innovations, producers had surpluses of product in search of new markets. The parallel developments of poisons for humans and pests made this transition smoother than might have been otherwise. But pesticides were not the only chemical innovations looking for markets. Demand for materials during World War II had necessitated the creation of a host of new chemical products that needed new users/consumers (Ndiaye, 2007).

Behind this push of wartime products into the civilian market were the skills developed in those war years by chemists and chemical engineers in the field of mass production. Stories of innovation of new materials, like radioactive material, typically dominate our fables. Missing are the engineers who figured out how to produce these materials on scales previously unfathomed (Ndiaye, 2007). Indeed, scale becomes one of the defining characteristics of the modern chemical enterprise with rippling effects on economies and environments. And it set the stage for that most pervasive of modern chemical wonders: plastic. The combination of the creation of new synthetic materials with the engineering capability of mass production made these new artifacts possible. It is difficult to imagine a day in modern life where plastic is not present. Their plasticity in form and function has made them ubiquitous in our lives. Their durability and their sheer endless quantities have made them ubiquitous in our environment. Despite the various and intimate ways in which these materials shape our lives, little thought was given to what might result from those constant contacts.

RACHEL CARSON AND THE DECADES OF DISASTERS

For most folks, 1962 is the turning point for our contemporary concerns and preoccupations with synthetic chemicals. In that year, Rachel Carson published *Silent Spring*, altering the political landscape with her warnings about the ways in which synthetic chemicals produced during and in the wake of World War II were changing the chemical composition of our environment and our bodies (Carson, 1962). While Carson's legacy continues to be debated, the fact remains that she succeeded in drawing attention to the ways in which our understandings of the natural world were being radically remade in this post-war era. While her fame and notoriety more commonly flow from her discussions of dichloro-diphenyl-trichloroethane (DDT), in truth Carson identified many of the emerging problems that became hallmarks of the decades to follow (and which, by and large, remain our key points of concern). She worried not simply about DDT, per se, but its ability to persist in local ecologies, to move across the ecological landscape, and to accumulate as it moved through the environment and the food chain. Today we call compounds of this type as PBTs—persistent, bioaccumulative or toxic chemicals. Carson could not point out that compounds like DDT are PBTs; she was in a sense defining them as a class of chemicals as she wrote. Her legacy is perhaps better remembered not through the ban on DDT, but through the establishment of PBTs as a class of chemicals of concern; through the Stockholm Convention

in 2001; through her work to link the human body with its environment; and perhaps most importantly through the attention she gave to observing nature not simply as a place separate from humans, but as a place where we see directly the ways in which our actions join with the environment, and eventually come back to us.

Carson's writings echoed all the more forcefully as the 1970s and 1980s produced a litany of names of places to mark one chemical disaster after another, which helped to mark a new era of vigilance, activism, and regulation. Images of a Cuyahoga River in flames and cities blanketed in smog helped to instigate a national (and eventually global) conversation about the state of nature. But if water and air were the visible poster-children for environmental regulation and industry reform, the more silent spills, leaks, and contaminated sites were nonetheless receiving increased scrutiny. Events in Love Canal, Times Beach, and Seveso introduced words like dioxin into the global vernacular. But it was the events of December 3, 1984 that rewrote the relationships between governments, industries, citizens, and activists. The escape of methyl isocyanate from a Union Carbide plant in Bhopal, India killed thousands in a single night and left scores of thousands more ill and debilitated for decades. Beyond the enormity of the tragedy that unfolds from there, the incident marked an important moment in thinking about chemical hazards.

The tragedy at Bhopal reconfigured the relationships between citizens, corporations, and the state in dramatic ways. Corporations were made to confront the meaning of being both local and global citizens. In succeeding years, the chemical industry banded together realizing that the weakness of one could be end of them all. They worked to become global partners in establishing new standards for operation at their facilities, largely through the establishment of the Responsible Care program. Beyond operational procedures, the program also encouraged more engagement at the local level with neighboring communities. Communities, too, sought new avenues for cooperation and new partnerships. Direct interaction with plant managers and operators helped to fill the void left by many disengaged state apparatuses. Nongovernmental organizations (NGOs), too, seized the moment and began advocating with and for communities as they sought safer living conditions. With the growth in online activism in the closing years of the twentieth century, local communities linked with one another in ways that created bridges across geographies, while also making geography less important. For all the new modes of advocacy and interventions created in response, Bhopal remained a tragedy seeking justice. As we passed the quarter century mark since the first insult, the waters around Bhopal remained polluted, communities continued to suffer elevated incidents of a plethora of diseases, and the factory itself slowly introduced new problems as its decaying remnants leached into the land. Perhaps, then, Bhopal served not so much as a symbol of an industry that was, but as a symbol of what a new globalized industry would become (Fortun, 2001).

AT THE CLOSE OF THE TWENTIETH CENTURY AND BEYOND

As the twentieth century closed, humans found themselves sitting at the nexus of this long and diverse history. Our practices, products, and pollution represented an uneasy

mix of recent innovations and old hazards. While the blunt fact of these hazards may not be new in human history, stark differences do separate what was from what is becoming. New tools—conceptual, political, and material—are emerging to confront the hazards that our industrial heritage has born out. Three topics in particular warrant further discussion.

First, our understanding of risk and the links between human and environmental health have become more sophisticated, more nuanced, and more powerful. That is, the picture has become more complex. As the previous stories outline, our understandings between our contact with the world, our manipulations of that world and our health have been evolving for millennia. In more recent times, our scientific enterprise has become fractured and specialized. Experts exploring human health rarely come into contact with those exploring similar issues and questions in the nonhuman worlds. But recent decades have brought about a convergence, some stemming from those thoughts penned by Carson, others as a result of keen observations, and still more thanks to those minds that see connections in the world where others see only differences. Seemingly “old” sciences and end points like developmental biology, chemical mutagenesis, and carcinogenesis have found new meaning within new sciences such as endocrine disruption, epigenetics, toxicogenomics, and other offspring of the -omics revolutions. These mergers have provided opportunities to reexamine the connections between humans and their environment. And through increased analytical capabilities, which have led to the development of a plethora of new studies in human biomonitoring, our intimate connection with our environment is once again being made tangible. These insights have changed the ways in which we perceive time and space in terms of chemical contamination.

The flow of chemicals follows ecological boundaries, not political boundaries. Likewise, then, systems for controlling chemicals must respect and privilege the ecological over the political. Managing the hazards presented by chemical exposures is not new, of course. When Duke Eberhard Ludwig of Württemberg issued an edict in 1696 promising “loss of life, honour, and fortune” to all those who dealt in wine adulterated with lead oxide, he and his advisors were instituting a system of chemical management to protect human health (quoted in Eisinger, 1982). But as the business of the chemical sciences grew, with its processes more intensive, its volumes expanding, and its products traveling the globe, such localized measures have been replaced with more serious forms of global governance.

Unions served as one of the early conduits for the internationalization of chemical and industrial hazards in the late nineteenth and early twentieth centuries (Markowitz and Rosner, 2002; Michaels, 2008). Their networks helped to unite workers in chemical plants whose exposures and diseases were not confined by political spaces. Since many chemical companies, too, existed beyond these political boundaries, the work of the unions helped to spur a new era of investigation into the hazards of the workplace. But while some companies may have crossed these boundaries, operators in each nation still played by local rules. And so while these channels proved crucial for moving knowledge across the Atlantic, their actions were not immediately successful in uniting governments.

INTERNATIONAL COOPERATION ON MANAGEMENT

The harmonization of national policies finally became a topic when, in 1972, representatives from the global community met in Stockholm to discuss the intersections of humans with their environments. This conference was a milestone in thinking about the ways in which humans from all countries are required to come together as a global community to take collective ownership of the emerging environmental problems. That is, it perhaps marks the beginning of a global perspective on the need to protect shared, common, resources and to create healthy environments for all. The decades following the first meeting in Stockholm have witnessed a continued proliferation of international efforts: conferences in Rio (1992) and Johannesburg (2002); legal instruments arising from meetings in Basel, Rotterdam, and Stockholm; the creation of the United Nations Environment Programme and the Organization for Cooperation and Economic Development; and perhaps more importantly organized institutions and communities that have kept up the work during the long pauses in between. Since such highlights in the global management of chemicals are the subject matter for this volume, I will leave the details to the experts that follow. But it is important to note the diverse nature of these organizations: they represent nations, industries, scientific communities, policy experts, environmental professionals and more. They represent the four corners of the world and a spectrum of expertise. But the question remains: what will it take to create a truly global system of chemical management that can adequately protect *all* peoples *and* our living environment? It is here that we see the one component of recent decades that has played such a key role, but one that is still largely missing from our public dialogues about chemical management and governance: the role of social movements.

ENVIRONMENTAL JUSTICE AND GOVERNANCE

The environmental justice movement in the United States of America, for example, has historical roots intertwined with that of the civil rights movement, which emerged about the same time as our modern environmental movement (Pellow and Brulle, 2005). Despite these commonalities, we traditionally treat the development of these three events as largely separate and distinct. The more familiar origin stories for the environmental justice movement place it in more recent decades, arising out of an increasing awareness about the proximity of neighborhoods comprised of racial minorities and low income to industries that presented environmental health hazards. In the decades since, the environmental justice movement has brought renewed attention to the local, place-based hazards that confront many communities located near chemical facilities. These experiences, often articulated through direct action or coordinated outreach, must inform any chemical management system—local or global. Examples abound in recent decades: leaded gasoline, asbestos, lead in paint—taboos of the United States and many European nations become surplus stock, which become cheap goods that continue to find significant markets in other countries. From time to time, these goods circulate back to us, perhaps in the form of children's toys, but by and large many of us presume these artifacts of an earlier industrial age have gone the way of the dodo. But our materials and their constituent chemicals

travel the globe on commercial and ecological winds requiring vigilance locally and globally (Ottinger, 2010).

The results of these efforts are not limited to social movements. The work undertaken and continuing by a variety of activist groups tied to environmental justice, environmental health, and globalization have created new tools for both local and global chemical management. The Bucket Brigades that arose in the refinery towns of Louisiana's chemical corridor, South Philadelphia, and the Bay Area have become globalized networks of environmental justice (EJ) activists sharing tools, tactics, and information (Casper, 2003; Washington et al., 2006). The buckets, themselves—an "ordinary" five gallon bucket turned into a cheap, portable, air monitoring canister—have changed the way instruments for community monitoring have developed. And their users, "citizen scientists," have challenged ideas of authority and expertise in creating their own information about chemical health and risks. Consider, too, the continued efforts to bring justice to Bhopal through organizations like the International Campaign for Justice in Bhopal, which brings together a coalition of NGOs and individuals seeking support for the survivors of that lingering event. But while such examples offer a glimpse at what has been and could be done, there remains very little coordination between the official experts and community activists—despite the treasure trove of data which the latter have collected.

All of which becomes dramatically more important when we consider the geography of chemical production that will unfold in the coming century. Refining and production facilities have already begun to relocate to the global South. The trend will accelerate in coming years as the cost of doing business in the North comes up and companies seek to locate their facilities closer to their new consumer base in countries like China, India, and Brazil. As we debate the effects of Toxic Substances Control Act reform in the United States and the effects of Registration, Evaluation, Authorisation and Restriction of Chemicals in the European Union, we must also be thinking more globally and seeking answers about the ways in which these changes in national dialogues will change what happens in the new centers of production. What will a chemical management program for the twenty first century look like? What will it *need* to look like to bring harmony to our systems of oversight that protects *all* citizens from harm, no matter how far downwind or downstream they may be? Finding ways to merge the national and global sentinels of health and regulation with the views from citizens in the street might lead to a system of management that can actually succeed.

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Section II

Conferences

2 Stockholm 1972

Conference on the Human Environment

Lars-Göran Engfeldt

The unanimous adoption on December 3, 1968 of United Nations (UN) General Assembly Resolution 2398 (XXIII) was a seminal event. In accepting the proposal made by Sweden for the convening of a United Nations Conference on the Human Environment in 1972, the UN took on a vast new cross-sectorial area, the human environment, for international cooperation at the highest global political level. Earlier, such cooperation had been fragmentary, scientifically oriented, and mainly based on nature conservation. Environment diplomacy was born as a new and distinct type of diplomacy. A unique multilateral process followed, marked by strong continuity and agenda strength, which has been carried on up to the present day. Its high points were the pioneering Stockholm Conference in 1972, the 1992 United Nations Conference on Environment and Development in Rio de Janeiro and the 2002 World Summit on Sustainable Development in Johannesburg.

The initiative of Sweden was a reaction to the visibly increased ecosystem disturbances that occurred when human activities started to impact the entire planet around the middle of the twentieth century. Several factors converged in the 1960s that laid the basis for national and international political responses to the environmental problems. They included strong public reaction in industrialized countries, influential publications such as Rachel Carson's *Silent Spring* in 1962 (Carson, 1962), and spectacular environment-related accidents.

In several industrialized countries, the period up to 1972 saw the enactment of environmental legislation and the setting up of government machinery for environmental protection. This process accelerated particularly fast in the United States, which held a preeminent international policy leadership role since the end of World War II.

Two main factors dominated the landscape of the UN in the 1960s: the Cold War and a shift toward emphasis on economic and social development issues.

The Cold War imposed severe limitations on the work of the organization to maintain international peace and security. The Security Council was often paralyzed as the two opposing world powers, the United States and the Soviet Union and their allies, locked in fierce competition for geopolitical influence which played out in the organization itself and in the rapidly decolonizing parts of the world.

The decolonization also led to the UN's increased involvement in economic and social development. With decolonization, the number of member states rose from 51 at the UN's outset in 1946 to 123 in 1967.* The situation in many of these new states was often desperate, prompting the start of international development assistance. Initial hopes that these would be only temporary efforts to support self-help soon began to fade.

Two seminal initiatives were taken to increase the role and leverage of developing countries. The first was the founding of the nonaligned movement in 1961, which had a general political role. The second was the establishment by 77 developing countries of a joint negotiation mechanism, the Group of 77 (G77), at the first United Nations Conference on Trade and Development (UNCTAD) in 1964 with the aim of safeguarding the economic interests of the members in UN negotiations on international economic issues. The creation of the G77 was an important political development for the Stockholm process, even if the model of group to group negotiations was formalized only at the time of the preparations for Rio.

The rapid developments in science and technology saw the emergence of new types of agenda items in areas where the United States and the Soviet Union did not have colliding interests, such as the peaceful uses of outer space and the seabed outside areas of national jurisdiction. The possibility of using scientific discourse to promote détente was being explored both in the United States and the Soviet Union by the time of the Swedish initiative. This included the environment which was seen then as a largely scientific and technological issue.

Favorable UN dynamics combined with the geopolitical position of Sweden and the key role of the chief architect of the initiative, the Permanent Representative of Sweden to the UN, Sverker Åström, were the main assets supporting Sweden's role as initiator and facilitator during the initial years.

In light of later experiences it can be recalled that the prevailing serious institutional shortcomings and limitations figured prominently already in the considerations preceding the initiative. The post-World War II international system, strongly anchored in the overriding principle of national sovereignty, had not been equipped to respond to the demands of the rapidly changing and ever more interdependent world. It was deemed unlikely that this would change anytime soon as no major country questioned this system and its underlying principle of sectorial organization and decision making. The only realistic possibility to deal with the new cross-sectorial environmental issue was to promote increased coordination between the parts of the system. Within the fragmented UN structure, the specialized agencies could not be expected to accomplish such a transformation. This would require strong initiatives from governments, which in turn was unlikely as they themselves had a long way to go with regard to coordination within their own administrations. The effect was that the specialized agencies operated as independent entities in the international system, supported by their national interest groups, and jealously guarding their roles and prerogatives. The conclusion drawn in 1968 was that if anything were to be accomplished in the international field, it had to be done within the existing context with all its limitations.

* The present number is 192.

The concept that was launched by Sweden was visionary for its time and, at the same time, politically realistic. It had the following main building blocks.

- *Global scope:* The global character of the environmental problems as well as the need for increasing public interest in the issue made it natural to consider convening a UN Conference.
- *Broad involvement:* The strong need to increase awareness about the full economic, social, and political effects of these problems required bringing together actors from different sectors and disciplines. Through greater insight, it would be easier to gain acceptance for the necessary measures at national and international levels.
- *Action orientation:* The Conference needed to focus on certain concrete problem areas in order to gain an overview of those problems that could only, or best, be solved through international cooperation. It would also be useful to define an international division of work for taking the appropriate regulatory measures. An action-oriented perspective was thus clearly present from the beginning.
- *Interagency coordination:* The need for interagency coordination was crucial. The only way to mobilize enough political support and strength for this to happen was to try to establish a comprehensive framework by ensuring that a broad discussion could take place at the central UN level and through this vehicle achieve a common outlook and direction of the efforts of the UN system. A negative approach toward the specialized agencies would have been counterproductive. Instead, it needed to be made clear that the activities of the agencies would continue as before, and the best possible cooperation would be sought with them.
- *Cause–effect focus:* The Conference needed to focus both on the deleterious impact of human activities on nature and on the effects on humans. In the first category, pollution of various kinds and chemical contamination were to be highlighted while the second looked at issues such as negative consequences of rapid urbanization.
- *Current institutions:* No new international institutions were to be proposed. At the time, this was the internal consensus view.

The preparatory process for the Stockholm Conference took place in two phases. The first was a political anchoring stage under Swedish leadership and lasted to the summer of 1970. The second, substantive, stage started in the autumn of 1970 when the importance moved to the newly appointed Secretary-General of the Conference, Maurice Strong of Canada, and his independent Conference secretariat.

The initiative had its core supporters among a group of western industrialized countries, notably the Nordic countries, Canada, the Netherlands, and the United States. Their focus was on international cooperation dealing with global environmental problems deemed to be of common interest to all countries, especially various forms of pollution. They argued that developing countries might be able to avoid the kinds of costly mistakes made earlier by industrialized countries in their own process of economic and social development. This meant that the focus was on the

self-interest of developing countries, with the underlying assumption that no major changes in the international economic system were called for.

In the first phase, a series of political obstacles was overcome through diplomatic efforts. This included the active opposition of UK, France, and the specialized agencies. Ideological constraints by the Soviet Union were also overcome. The almost nonexistent capacity of the UN Secretariat in the field of environment was another serious threat which was averted due to the link which the Secretariat established with the Swedish UN mission for advice and assistance. The Secretary-General of the UN was entrusted with the overall responsibility and an advisory Preparatory Committee was established. This secured a wide mandate for Maurice Strong.

Several important issues for the entire Stockholm–Rio–Johannesburg process were identified during these initial years. These included the complex environment–development linkages, the special needs of developing countries, the need for prevention and precaution, and the uncertainties of climate change. The process manifested a clear potential for normative development and measures to increase overall understanding of the environmental threat. The first proposals were made for legally binding agreements dealing with various sources of pollution.

Different views emerged about the future role of the UN in the new area of the environment. The key proponents wanted an action-oriented and broad consideration of the issue with the UN at the center in a clear coordinating role. UK and France echoed views of the specialized agencies that the central authority should remain with the agencies and kept a restrictive position. The Soviet Union also had strong reservations about central coordination.

There remained a lack of clarity as to the real political commitment and involvement of developing countries which comprised the vast majority of member states. This problem took an ominous turn when Brazil attacked the initiative in the spring of 1970, characterizing it as a “rich man’s show” to divert attention from the development problems of developing countries (Engfeldt, 2009, p. 41). When it became clear that the Conference project was so well anchored in the UN that it could not be dismantled, Brazil refocused its political energy on safeguarding what it felt to be the real interests of developing countries in the preparatory process. One reflection was the introduction, later in 1970, of the demand that rich countries had a duty to put additional resources needed for environmental protection measures at the disposal of developing countries—the additionality concept. This triggered a gradual development of the entire process with its culmination in the preparations for the Rio Conference when the environment issue was incorporated in the overall framework of North–South relations.

As the second stage got under way, Maurice Strong quickly managed to gain the confidence of delegations. He managed to exercise a remarkable level of personal influence, while at the same time maintaining the confidence of delegations. The design of the preparatory process, the methods of accelerating political agreement and the innovative role of the Conference secretariat were key ingredients of his leadership.

He conceived a three-level preparatory process that would avoid the seeming contradiction between the desire by governments for both comprehensiveness and action.

Level 1: Intellectual and conceptual framework: designed to provide a comprehensive review of the existing state of knowledge and opinion on the relationship

between man and his environment. The main contribution was an unofficial report prepared by Barbara Ward and René Dubos with the title of the motto of the Stockholm Conference, “Only One Earth” (Ward and Dubos, 1972).

This innovative publication constituted the world’s first state of the environment report when it was published in 1972 and had a major impact on public opinion and elites in industrialized countries and also, to some extent, in the developing world.

Level 2: Action plan for future work: producing an action plan and work program for the years ahead was the centerpiece of the substance considered at the Stockholm Conference. The plan would contain those items that had sufficient consensus to enable agreement: (i) on concrete recommendations for further action, and (ii) on institutional arrangements for taking such action.

Level 3: Issues for immediate action: consisted of specific issues that required immediate initiation of international action that could be completed, at least through an initial stage, by the time of the Conference.

Maurice Strong’s “process is the policy” concept was an innovative tool to increase the quality and level of consensus gradually by promoting constant interaction between the substantive and political aspects of an issue. This was undertaken through a complex series of consultations and negotiations, parallel or additional to the official proceedings. The concept was assisted by the deadline presented by the Conference itself, which served as a powerful stimulus to achieve results.

Strong also broke new ground that would have major repercussions in the future by opening up the process and inviting the active involvement of civil society, the scientific community, and the corporate sector.

The Conference secretariat combined innovation with a high level of ambition and thoroughness never before seen at a UN Conference. The amount of documentation was drastically reduced, and the resources released were used to set up an impressive network of influential consultants from all geographic regions. The secretariat played a significant role with lasting effects in the preparations of national reports and their analysis. This process was greatly assisted by the visits by Strong, or his representatives, to many countries. It was also important for the outcome that the conference papers were the exclusive responsibility of the secretariat and not of the specialized agencies. This ensured that a unified and coherent perspective was presented, in line with the original aim to provide a common outlook and direction for the international environmental efforts.

The task of positively engaging developing countries emerged as a main challenge when a thinly veiled threat of a developing country boycott of the Conference was articulated in the spring of 1971. There was deep dissatisfaction that the preparations in their view were too oriented toward the interests of industrialized countries. In a strategic breakthrough, Strong managed in June 1971 to persuade the Prime Minister of India, Indira Gandhi, to come to Stockholm where she was the only foreign Head of State at this ministerial level Conference. Her address to the Conference that mass poverty is the greater polluter of all had a profound and lasting political effect. Substantively, the special seminar held in Founex, Switzerland, in June 1971 was a defining moment and paved the way for the attendance and active involvement of developing countries in the Conference. Its report was also a major intellectual contribution to the further international discourse on environment and development.

The key message from Founex was contained in the following sentence: “If the concern for human environment reinforces the commitment to development, it must also reinforce the commitment to international aid” (United Nations, Development and Environment, 1972).

The three main substantive decisions taken by the Conference consisted of the *Stockholm Declaration*, *Action Plan*, and the *Resolution on Institutional and Financial Arrangements*. Thanks largely to the organization of the preparatory process they had been widely agreed before the Conference.

As the role of the Preparatory Committee was an advisory one, the intergovernmental process was to a large degree of a consultative character. The preparation of the *Declaration* was an exception with governments fully in charge. This became a milestone document, which provided the first agreed global set of basic normative principles for future work in the field of the human environment, and made a considerable contribution to the development of international environmental law. Its concepts were further elaborated by the 1992 Rio Declaration (see Chapter 3 of this book). *Principle 21* has been widely referred to as the most important legal point in the Declaration. This Principle included an affirmation of the responsibility of States to ensure that activities within their jurisdiction do not cause damage to the environment of other States, or of areas beyond the limits of national jurisdiction.

The *Action Plan* was conceptually based on the knowledge theme. It focused on strengthening ongoing activities within the UN system, particularly research and studies of various kinds, supplemented by calls for normative developments in some areas. Beside the Declaration, one other Level 3 process achieved a concluded international action by the time of the Conference. That was in the field of marine pollution, the London Dumping Convention formally adopted later in 1972, followed by the MARPOL Convention of 1973.

Most of the 150 recommendations contained in 109 points were adopted by consensus. Among the most controversial ones that had to be adopted by vote, with reservations or watered down, were the issues of family planning and a proposal for a 10-year moratorium on commercial whaling.

The Action Plan was an impressive achievement for its time and became a major stimulus to ongoing activities, and to several new ones, including a more systematic monitoring of the state of the environment.

The new activities included the convening of the Habitat I Conference in Vancouver in 1976, the establishment of a warning system relating to natural disasters, an expansion of international cooperation in marine pollution, an international program for the protection of the world's genetic resources, the development of standards for measuring and limiting noise emissions, and activities related to the control and recycling of wastes in agriculture. The Plan also was instrumental in establishing an international program in environmental education.

The Plan further recommended that plans should be developed for an international registry of data on chemicals in the environment (International Registry of Potentially Toxic Chemicals (IRPTC)), for monitoring and epidemiological research programs aiming at early warning and prevention of deleterious effects of environmental agents and for the establishment of an international referral system for sources

of environmental information (INFOTERRA). Also, a worldwide network of monitoring stations was set up.

An important contribution of the Plan was also that it contained language that was a precursor to the precautionary principle embodied in the Rio Declaration on Environment and Development adopted in 1972. This included a warning to be mindful of activities in which there was an appreciable risk of effects on climate.

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As the substantive preparations of the Conference got under way, there was increasing agreement that an organized, *institutional follow up* would be necessary. The concept chosen was heavily influenced by Maurice Strong's thinking. He foresaw Stockholm providing the impetus that could link all components of cooperation from different organizations within a network or system. Instead of a new specialized agency or executive organ, a policy evaluation and review mechanism could become the institutional center or brain of the international environment network. Its operational influence should be exercised through financing. An early consensus emerged among member states for various reasons that no new specialized agency should be established.

The end result was a recommendation to establish the United Nations Environment Programme (UNEP) with the following four entities.

An intergovernmental committee (Governing Council) is set up under the General Assembly with the task of providing general policy guidance for direction and coordination of environmental programs within the UN system and to keep the world environmental situation under review.

A *small environment secretariat* to serve as the focal point for environmental action and coordination within the UN system led by an Executive Director (ED), elected by the General Assembly on the nomination of the Secretary-General. Normally, officials with the same rank (Under-Secretary-General) were appointed, not elected, by the General Assembly. This placed the ED on the same level as the heads of the specialized agencies. The ED was further mandated to advise UN intergovernmental bodies, a unique role for an international civil servant. Following the Stockholm Conference, the General Assembly decided in the autumn of 1972 to locate the secretariat in Nairobi after a debate that at times became acrimonious with industrialized countries arguing for a location of such a catalytic organization in the center of the UN system, and not in the periphery.

A voluntary *environment fund* created to provide additional financing for environmental programs in order to finance, either wholly or partly, the costs of the new environmental initiatives undertaken within the UN system. The underlying rationale was that the specialized agencies would also increase their own financial resources in the field of the environment, which they failed to do for many years. There was a general realization that the fund would not play any significant role in

overall development assistance. The United States had pledged to offer US\$ 100 million during a five-year period on a 40% matching basis.

An Environment Coordinating Board (ECB) is set up under the chairmanship of the ED in order to have maximum efficiency in coordinating UN environmental programs. Governments were called upon to ensure their own coordination of environmental action, both national and international. The ECB was abolished in 1977.

The Conference faced considerable managerial and political challenges when it convened on June 5, 1972, a day that has since been commemorated as World Environment Day.

The Conference attracted many more direct and indirect participants than had been foreseen. There were 1350 delegates from 113 countries, 850 observers from the specialized agencies, and 250 nongovernmental organizations (NGOs), as well as an unprecedented attendance of 1600 representatives of media. There were also many nongovernmental representatives present who did not engage directly in the Conference. The total influx from abroad was between 4000 and 5000 persons.

Also, delegates had only 10 working days at their disposal to consider the massive agenda. This was the case even after deciding to limit the consideration only to recommendations for international action, and forward recommendations that had been developed for national action to governments for their consideration. This reflected the political sensitivities at the time to what could be seen as interference in internal affairs of states.

The organizational arrangements stood up excellently to an extraordinary challenge of which there had been no previous experience.

Several important political factors contributed to the favorable dynamics of the Conference.

The issue of nonparticipants was particularly sensitive because of tensions between NGO's and governments. In the end the feared, violent incidents did not materialize. An important contribution was the establishment of the Environment Forum, and a more informal NGO facility outside Stockholm. The NGO factor played a considerable role in how the Conference proceedings evolved, particularly in the issue of commercial whaling.

The decision-making procedures were marked by the novelty of the situation, and by the presence of so many delegates who were not familiar with UN procedures. If the substantive issues had not been cleared to such a major extent in advance of the Conference, it would have been very difficult to ensure success.

The decision at the last moment by the Soviet Union and its allies not to participate because of a long controversy related to the Cold War, the noninvitation of the German Democratic Republic, was a setback, but did not negatively affect the proceedings. Understandings had been reached before the Conference not to let the invitation problem affect considerations of substantive question.

A most important result was that a feared environment-development conflict was prevented, which was largely due to the Founex initiative and its effects. However, the bitterness of specialized agencies over having been rebuffed at an earlier stage in their demands to introduce the substantive areas took an ominous turn during the Conference and was only barely contained.

Overall, there was a strong desire by several key delegations to demonstrate their own constructive roles to their home constituencies who were able to watch the Conference proceedings closely through the massive media reporting. China was a particular case. This was the first important international event in which it participated as a new UN member. China quickly established itself as an undisputed leader among developing countries and took a high profile. Its involvement in the substantive negotiations remained limited to the draft Declaration, which was reopened at its insistence.

The Conference ended on a high note after overcoming the hurdles surrounding the Declaration, particularly the issue of weapons of mass destruction. There was a feeling of important accomplishment, and even that history had been made.

The results by far surpassed the original objectives. Through the Stockholm Conference, the environment was legitimized as an area of both national and international concern and cooperation and the first steps were taken to give practical effect to this new recognition. A visible point of reference and authority for all future international work in the environment field had been established. Stockholm also initiated the drive to widen the environment agenda beyond concerns about conservation and pollution to include issues such as development assistance, trade and development.

Further, the Conference was instrumental in building national and international institutions in the environmental field, and in establishing a framework for treaty making. It was the first event in which civil society participation was directly supported and had a concrete impact in an intergovernmental negotiation process, and it became a model for many global UN Conferences.

There were also issues and areas where political and structural constraints had a restrictive effect, or when developments proceeded in unforeseen directions.

Restrictive effects included the controversy over the population question and the difficulty of adapting economic policies to the environmental challenge in both industrialized and developing countries. This would have determining effects for the further process in both cases.

The Action Plan focused on the symptoms rather than the causes of environmental problems. This was in line with prevailing thinking and administrative methods but, in practical terms, it established the environment as an add-on issue, and did not support the integrative message that had been developed so successively during the preparatory processes, such as the Founex seminar. As a consequence, environmental measures still continue to be considered additional rather than integrated parts of economic policy.

Also, the Action Plan did not address the issues of costs or relative priorities. There was a prevailing perception among delegations that the Conference and its follow up would not affect national interests and priorities in any fundamental way. Significantly, there was relatively little specific focus on environmental policies of industrialized countries. This was a result partly of the activities of a secret group of some industrialized countries (the Brussels group) and partly of the financial dependence of developing countries on the North.

There were also serious limitations imposed on UNEP from the beginning. It had not been possible to secure a strong and binding general coordinating mandate for the new environmental body. Significantly, the specialized agencies, supported by

France, the Soviet Union, and the United Kingdom, managed to specifically weaken UNEP from the outset in a key role—coordination of assessments. This issue remains closely linked to the dilemmas of sectorial decision-making structures at the national level, and the continuing lack of will and capability to significantly reform the obsolete structure of the UN system.

The limits of political space had been clearly outlined even before the final negotiation phase of the Stockholm Conference began when an attempt to set up a powerful UN Charter body with the working name “Biosphere Council” received practically no support.

The problem of issue fragmentation that followed after Stockholm is the prime example of unforeseen effects. Initial progress in reducing complex ecological problems to manageable levels by negotiating a multitude of agreements (some 300 new multilateral environment agreements after Stockholm) led over time to serious loss of coherence and policy control, compounded by an increasing implementation deficit and a general lack of enforcement.

Despite these serious challenges, discussed further on in this book, many of which remain with us today, the Stockholm Conference has proved to be the real start of the international management of chemicals, resulting in a set of instruments that shape today’s and tomorrow’s work in this field.

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3 Rio 1992

The UN Conference on Environment and Development (The “Earth Summit”)

*Shelley Kath**

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* The opinions expressed in this chapter do not necessarily reflect the views of the Helios Centre.

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INTRODUCTION

Many of the core concerns underlying policy instruments and international regulatory regimes in the realm of chemical and hazardous waste management have their roots in the 1992 United Nations Conference on Environment and Development (UNCED) held in Rio de Janeiro, Brazil and known informally as the Rio Earth Summit. As a result of the agreements and consensus-building achieved during the conference, the underlying notion that people have rights to a healthy environment was ensconced in both the language and foundations of international agreements and a certain collective consciousness. This was nothing less than a paradigm shift, signaling not only an increase in expectations, but intergovernmental support for the legitimacy of those expectations.

Consequently, the tenets we now consider crucial to environmental regulation and advocacy flowed directly from the Summit. Three specific concepts, the application of the precautionary principle, the polluter-pays principle, and the notion of free access to environmental information (Huismans and Halpaap, 1998; Peterson, 2004), emerged directly from the *Rio Declaration on Environment and Development*,* in *Principles* 15, 16, and 10, respectively. Another well-known product of Rio, the massive and comprehensive implementation plan known as *Agenda 21*,[†] contains in Chapters 19 and 20 the key values, guidelines, and policy recommendations that serve as fundamental elements of important regimes such as the Rotterdam and

* Declaration on Environment and Development, UN Doc. A/ CONF.151/5, reprinted in 31 I.L.M. 874, 877 (1992).

[†] <http://www.un.org/esa/dsd/agenda21/>

Stockholm Conventions and the Globally Harmonized System (GHS) of Classification and Labeling of Chemicals.*

Thus, to assist in understanding the history, development, and future direction of chemical and hazardous waste management at the international level, we review the products, organizations, and legacies forged at and as a result of the Rio Earth Summit. In addition to examining the written agreements produced and organisms launched at Rio, we will also provide a brief analysis of the effectiveness of these products in furthering the goals of sustainable development and in advancing the state of chemical and hazardous waste management.

HISTORICAL OVERVIEW

Twenty years after the first global Conference on the Human Environment, held in Stockholm, Sweden in 1972, over 170 nations convened in Rio de Janeiro, Brazil, from June 3 to 14, 1992. The intent of the conference was to continue the environmental work begun at Stockholm, and begin a close global examination of the concept of sustainable development. This concept grapples with and seeks to reconcile the intertwined needs and reciprocal impacts of environmental quality and economic development. The UN Conference that was to affect all future such meetings was this one, the Rio Earth Summit.

The original purpose of UNCED flowed from recommendations made in the famous report by the World Commission on Environment and Development (commonly known as the “Brundtland Commission,” named for Gro Harlem Brundtland, who served as its chair). Entitled *Our Common Future* (World Commission on Environment and Development, 1987),[†] the report made recommendations designed to rectify what the Commission had identified as the root cause of many of the world’s woes, namely, the fact that environmental and economic matters were so tightly intertwined that environmental policies that ignored economic concerns, and economic policies that ignored environmental issues, were destined for difficulty or defeat.

In an effort to make concrete the budding concept of sustainable development,[‡] the report set out a slate of measures for improving planning, decision-making, transparency, and other fundamental aspects of governance in ways that would balance economic and environmental concerns. Published in 1987, it also called for a high-level international conference to be held by 1992 to evaluate progress on implementation of the Brundtland Commission’s recommendations. Maurice Strong, a Canadian businessman and one of the world’s most influential political activists, was a Commission member and the leader of the effort to organize the 1992 conference. Having served as Secretary-General of the Stockholm Summit, he was well-suited to the task, and in 1990 was appointed Secretary-General of UNCED.

* UN *Globally Harmonized System of Classification and Labelling of Chemicals (GHS)*, 3rd ed., 1992, online at the UN Economic Commission for Europe, at: http://213.174.196.126/trans/danger/publi/ghs/ghs_rev03/03files_e.html

[†] This publication is often referred to as “the Brundtland Report.”

[‡] The oft-quoted definition of “sustainable development” reads: “Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs.” Ibid, p. 43.

As a venue, Brazil provided a stark contrast to the 1972 Summit in Stockholm. It was during their stay in South America that many environmental groups of the North witnessed for the first time the harsh realities of life in countries of the Southern hemisphere and began to understand that the priorities of people in such countries were not pollution abatement or protection of scenic wonders, but food, shelter, protection from hazardous waste among other fundamental necessities.

The UNCED conference at Rio was, at the time, an event like no other in the history of environmental assemblies. Indeed, the formal agreements made at Rio were but one part of the story, and perhaps more significant was the mobilization of tens of thousands of participants from across the globe—grass-roots activists, governments and heads of state, intergovernmental organizations such as the World Bank, nongovernmental organizations (NGOs), and business interests—all focused on plotting a course for planetary health (French, 2002). In addition to the main conference for delegates and other officials, a parallel forum for civil society was held also in Rio but some 20 miles away from the UNCED conference center (Brooke, 1992). The “Global Forum” (Esty, 1993), as it was named, drew some 17,000 people,* most of them connected with NGOs from around the world, who used the forum to share concerns, strategies, and frustrations surrounding the alleviation of the planet’s problems.

As this chapter will document, opinions vary widely on whether the Earth Summit can be characterized as a success, a failure, or some combination of the two. Since one reasonable measure of a global summit’s success is the extent to which it fulfilled its stated goals and objectives, we will begin our analysis with a brief look at why the Rio Summit was convened and what it was intended to achieve.

RIO EARTH SUMMIT GOALS AND OBJECTIVES

The UN Resolution adopted in December 1989 establishing UNCED outlines the official mandate for the Summit: to “elaborate strategies and measures to halt as follows and reverse the effects of environmental degradation in the context of increased national and international efforts to promote sustainable and environmentally sound development in all countries.”† Prior to this, the World Commission on Environment and Development recommended in its report to the United Nations General Assembly (UNGA) in 1987 that the issues of environment and development were inextricably linked, and that no real progress on one of these issues could be made without progress on the other. Among the Commission’s other recommendations were that the UN prepare a universal declaration and convention on environmental protection and sustainable development. As has been observed, the over-arching tenet of the commission, later echoed by both UNCED’s secretariat and chairperson, was that “environment and development issues be fully integrated” (Haas et al., 1992, p. 7).

* United Nations, Department of Public Information, *UN Conference on Environment and Development* (1992), May 23, 1997, “Summary,” p. 2 of 4, at: <http://www.un.org/geninfo/bp/enviro.html>

† UN Resolution 44/228, part 1.3, New York, NY, December 22, 1989.

The specific objectives of the Rio Earth Summit were many: UNGA Resolution 44/288 establishing UNCED lists a total of 23 separate aims, literally too many to mention. Among these, however, the following were particularly important:

- “To examine the state of the environment and the changes that have occurred” since the 1972 Stockholm Conference on the Human Environment.*
- “To recommend measures to be taken at the national and international levels to protect and enhance the environment ... through the development and implementation of policies for sustainable and environmentally sound development” that pay special attention to environmental issues within economic and social development processes, and which focus upon “preventive action at the sources of environmental degradation, clearly identifying the sources of such degradation and appropriate remedial measures, in all countries,” all while “taking into account the specific needs of developing countries.”†
- “To promote the further development of international environmental law,” and to examine “the feasibility of elaborating general rights and obligations of States, as appropriate, in the field of the environment, and taking into account relevant existing international legal instruments,” while allowing for the “special needs and concerns of the developing countries.”‡
- “To examine ways and means further to improve cooperation in the field of protection and enhancement of the environment between neighbouring countries, with a view to eliminating adverse environmental effects.”§
- “To examine the relationship between environmental degradation and the international economic environment, with a view to ensuring a more integrated approach to problems of environment and development in relevant international forums without introducing new forms of conditionality.”¶
- “To examine strategies for national and international action with a view to arriving at specific agreements and commitments by Governments and by intergovernmental organizations for defined activities to promote a supportive international economic climate conducive to sustained and environmentally sound development in all countries, with a view to combating poverty and improving the quality of life, and bearing in mind that the incorporation of environmental concerns and considerations in development planning and policies should not be used to introduce new forms of conditionality in aid or in development financing and should not serve as a pretext for creating unjustified barriers to trade.”**

While most of the listed objectives were of a general level, bracketing substantive issues, one made specific mention of toxics and hazardous wastes:

* UN Resolution 44/228, part 1.3, New York, NY, December 22, 1989, para. 15 (a).

† Ibid., para. 15 (c).

‡ Ibid., para. 15 (d).

§ Ibid., para. 15 (e).

¶ Ibid., para. 15 (h).

** Ibid., para. 15 (i).

To examine strategies for national and international action with a view to arriving at specific agreements and commitments by Governments for defined activities to deal with major environmental issues in order to restore the global ecological balance and to prevent further deterioration of the environment, taking into account the fact that the largest part of the current emission of pollutants into the environment, *including toxic and hazardous wastes*, originates in developed countries, and therefore recognizing that those countries have the main responsibility for combating such pollution.” (emphasis added).

As these objectives show, the Earth Summit was extremely ambitious: it was to do no less than review the world’s environmental problems, examine the relationship between environment and development, promote the theoretical and practical integration of these two subjects through the concept of “sustainable development,” launch new international agreements and policies, create new processes and structures for international cooperation on environmental and socio-economic issues, and do all these things while taking into account the special needs and concerns of developing countries. In retrospect, it seems clear that the attainment of the Summit’s numerous specific objectives was hobbled from the outset by the sheer magnitude of the task it had set for itself in attempting to resolve such a wide-ranging set of issues. Still, it is agreed by critics and supporters alike that the Rio Earth Summit was a ground-breaking event.

RIO EARTH SUMMIT OUTCOMES

OVERVIEW

The Earth Summit’s importance lay in the fact that it generated a new level of governmental consensus and public awareness as to the fundamental needs required for planetary recovery. Though the conference galvanized on multiple fronts a multitude of accomplishments, impacts, and initiatives, focus here is on the formal outcomes, namely, the written, legal, and policy instruments, and the creation and modification of specific organizations flowing from negotiations and agreements.

KEY RIO DOCUMENTS: PRINCIPLES, CONVENTIONS, AND A PLAN

What propelled the Rio Summit to its legendary status in the history of environmental policy is that Rio produced no fewer than five international agreements, which, as treaties, continue to play important roles for public policy. The five “Rio documents,” also referred to as the “Rio agreements,” include two sets of nonbinding principles (the *Rio Declaration on Environment and Development*[†] and the *Statement of Principles for the Sustainable Management of Forests*, or “Forest Principles”[‡]), two

* Ibid., para. 15 (f).

† Declaration on Environment and Development, UN Doc. A/CONF.151/5, reprinted in 31 I.L.M. 874, 877 (1992).

‡ Nonlegally Binding Authoritative Statement of Principles for a Global Consensus of the Management, Conservation and Sustainable Development of all Types of Forests, UN Doc. A/CONF.151/6, reprinted in 31 I.L.M. 881 (1992). Hereinafter “Forest Principles.”

treaties (the *UN Convention on Biological Diversity*, 1992,^{*} and the *UN Framework Convention on Climate Change*, 1993[†]), and one comprehensive action plan (*Agenda 21*[‡]). Additionally, it should be noted that the *UN Convention to Combat Desertification*[§] can be held to have been born in Rio, as it was during the Earth Summit that the process was put in place for negotiating this agreement. The five Rio agreements are summarized below, followed by a brief mention of Rio's contribution to the *Convention to Combat Desertification*.

Rio Declaration on Environment and Development

The Rio Declaration on Environment and Development ("Rio Declaration") lists the 27 major principles for sustainable management of the planet and in doing so sums up the philosophy of "sustainable development" (Weiss, 1992). As the United States and Israel refrained from reopening the debate during preparatory sessions regarding "people under occupation," a sensitive phrase and issue for both countries, the Declaration was adopted more easily than might have been anticipated and was the first document adopted at Rio (UNCED, 1992). As the International Institute for Sustainable Development stated in a summary of the proceedings:

The approved text represents to a large extent, an attempt to balance the key concerns of both Northern and Southern countries. Far from a perfect text, each side achieved success in enshrining those specific principles that are of particular importance to their respective political agendas.[¶]

The Rio Declaration distinguished itself from its 1972 Stockholm predecessor in three ways. First, it acknowledged the need for global awareness and government consensus in achieving sustainable development. Many of these principles had not, until that time, been universally accepted.^{**} Second, it highlighted the notion of common but differentiated responsibility for developing nations in contrast to industrialized states. Finally, it endorsed on an international level a precautionary approach to environmental protection (Weiss, 1992).

There are several principles in the Declaration that warrant specific review here, as their significance for international environmental law in general, and chemical and hazardous waste management in particular, cannot be understated. Four of the Declaration principles now represent key tenets of international environmental law: the human-centric tenet of sustainable development (*Principle 1*), the sovereign right of each state to exploit its own resources (*Principle 2*), the notion of "common but

^{*} June 5, 1992, reprinted in 31 I.L.M. 818 (1992). Hereinafter, "Convention on Biological Diversity."

[†] UN Doc. A/AC.237/18, reprinted in 31 I.L.M. 849 (1992). Hereinafter "UNFCCC."

[‡] UN Doc. A/CONF.15 1/4.

[§] Full text available on the Web site of the Secretariat for the Convention to Combat Desertification, at: <http://www.unccd.int/convention/text/convention.php>

[¶] International Institute for Sustainable Development, *Earth Negotiations Bulletin*, Vol. 2, No. 13. "A Summary of the Proceedings of the United Nations Conference on Environment and Development 3–14 June 1992," full text available at: <http://www.iisd.ca/vol02/0213001e.html> [hereinafter "IISD Summary of Proceedings"]. The quoted passage appears at "Part III: Rio Declaration," full text available at: <http://www.iisd.ca/vol02/0213032e.html>

^{**} Ibid, at: <http://www.iisd.ca/vol02/0213032e.html>

differentiated responsibilities” (CBDR) (*Principle 7*) and the precautionary principle (*Principle 15*). As mentioned in the Introduction, the precautionary principle plays a fundamental role in chemical and hazardous waste issues, along with three others: the “polluter pays” principle (*Principle 16*), the principle of intergenerational equity (*Principle 3*), and the notion of public access to environmental information and justice (*Principle 10*). We will look briefly at each of these principles.

Principle 1 states a fundamental tenet of sustainability: “Human beings are at the centre of concerns for sustainable development. They are entitled to a healthy and productive life in harmony with nature.” The Principle reflects the view of many developing nations that the *raison d’être* of “sustainable development,” and environmental protection in general, must be to improve the quality of life for human beings in the sense that the meeting of basic human needs must be paramount in environmental protection activities.

Principle 2 enshrines the state’s “sovereign right to exploit their own resources pursuant to their own environmental policies,”* so long as the right is carried out in line with the state’s own developmental policies. As in the Stockholm Declaration, Principle 2 also observes that the right to resource exploitation is accompanied by the “responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other States or of areas beyond the limits of national jurisdiction.”

Principle 7 encapsulates the principle of CBDR, a concept frequently thought to have been born at Rio, and one which continues to play an important role in framing the obligations of developed versus developing countries under a number of international instruments. But, like the precautionary principle, the CBDR principle predates Rio, having been an important concept underlying the 1987 *Montreal Protocol on Substances that Deplete the Ozone Layer*,† and recognized in other important international agreements (Sands, 1994, pp. 295–296). Specifically, *Principle 7* states:

States shall cooperate in a spirit of global partnership to conserve, protect and restore the health and integrity of the Earth’s ecosystem. In view of the different contributions to global environmental degradation, States have common but differentiated responsibilities. The developed countries acknowledge the responsibility that they bear in the international pursuit to sustainable development in view of the pressures their societies place on the global environment and of the technologies and financial resources they command.

Principle 15 articulates the “Precautionary Principle”—the notion that when an activity raises threats of harm to human health or the environment, precautionary measures should be taken even if there may still be some doubt about cause and effect relationships. Thus, *Principle 15* states:

In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious OR

* Rio’s *Principle 2* replicates very closely *Principle 21* of the Stockholm Declaration.

† Montreal Protocol on Substances That Deplete the Ozone Layer, Sept. 16, 1987, 26 I.L.M. 1541 (entered into force Jan. 1, 1989).

irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.

Contrary to popular opinion, the Precautionary Principle did not make its debut at the Earth Summit but rather first appeared in the World Charter for Nature that was adopted by the UN General Assembly in 1982.* Furthermore, some writers distinguish between a precautionary “principle” and a precautionary “approach,” with the latter being viewed as somewhat softer and not as likely to receive serious treatment in international law (Garcia, 1995; FAO, 1996; Recuerda, 2008).

Principle 16 has played an important role in creating a basis in international law for holding accountable companies and organizations whose activities result in pollution, for the environmental damage they cause. This principle states:

National authorities should endeavour to promote the internalization of environmental costs and the use of economic instruments, taking into account the approach that the polluter should, in principle, bear the cost of pollution, with due regard to the public interest and without distorting international trade and investment.

Principle 3, expressing the notion of intergenerational equity, is particularly important in matters of chemical management in light of the fact that certain chemicals, such as dichloro-diphenyl-trichloroethane (DDT), are known to have health impacts that may extend across generations. This principle is articulated as follows:

The right to development must be fulfilled so as to equitably meet developmental and environmental needs of present and future generations.

Finally, *Principle 10* on access to environmental information, contains the seeds of nearly all systems for reporting and making public various kinds of data and policy information that are required by international legal instruments. This principle states:

Environmental issues are best handled with participation of all concerned citizens, at the relevant level. At the national level, each individual shall have appropriate access to information concerning the environment that is held by public authorities, including information on hazardous materials and activities in their communities, and the opportunity to participate in decision-making processes. States shall facilitate and encourage public awareness and participation by making information widely available. Effective access to judicial and administrative proceedings, including redress and remedy, shall be provided.

Together, these and others among the Rio Declaration’s presentation of 27 principles have influenced and informed countless instruments and policies of international environmental law.

* United Nations General Assembly Resolution A/Res/37/7, October 28, 1982, Article 11. Available online at: <http://www.un-documents.net/a37r7.htm>

Statement of Principles for the Sustainable Management of Forests ("Forest Principles")

The Rio "Forest Principles," as this agreement is commonly called, consist of a non-legally binding "statement of principles" articulating the need to preserve forests without setting timetables or standards for doing so (Raloff, 1992). Essentially, the Principles lay out the basic policy requirements for realizing the goal of sustainable forest management.

Fifteen years after their introduction at Rio, the "Non-Legally Binding Instrument (NLBI) on All Types of Forests" emerged to strengthen the message of the Forest Principles. Together, these two instruments serve as the launching point for important new regime proposals, such as REDD (reducing emissions from deforestation and forest degradation) (Ikkala, 2009).

It may be said that the Forest Principles put forward at Rio were, as Haas, Levy and Parson noted, "salvaged from the wreckage of a failed earlier attempt to negotiate a treaty on forests" (Haas et al., 1992, pp. 6–11), an effort which had been ongoing for many years. Nonetheless, the general guidelines contained in the Forest Principles still play a valuable role as "soft law" in this area. According to Ken Wan, these principles "formed the foundation for the contextually specialized 'Sustainable Forest Management' concept, which recognizes that 'forest resources and forest lands should be sustainably managed to meet the social, economic, ecological, cultural, and spiritual needs of the present and the future generations'" (Wan, 2009; citing UN Department of Economic and Social Affairs, 2005).

UN Framework Convention on Climate Change

While generally understood as one of the Rio documents, the UN Framework Convention on Climate Change (UNFCCC) was actually negotiated prior to Rio and in a separate process from UNCED. The Convention was in fact adopted at UN Headquarters in New York on May 9, 1992, roughly one month before the opening of the Earth Summit. That said, the Convention was opened for signature at Rio, and on June 12, 1992 did gather signatures from 154 countries. As a result, the UNFCCC was, and is today, seen as an important outcome of the Earth Summit. The Convention entered into force on March 21, 1994 and there are now 194 parties to the Convention (193 states plus the European Community).

The UNFCCC, the first international effort of its kind, represented a monumental step, in addressing the multitude of serious problems caused by global warming and the concomitant changes in the Earth's climate. The Convention sets out an overall framework within which national and international actions are to be taken to tackle the environmental and social challenges posed by these impacts.

While the long-term goal for stabilizing greenhouse gas (GHG) emissions contained no specific targets, the UNFCCC's near-term, nonbinding goal included a specific objective for developed countries: they were to reduce GHG emissions to 1990 levels by 2000.* In a concrete demonstration of Rio Declaration *Principle 7* on

* By 2006, 16 of the 38 Annex I countries had met their targets while 19 had not. "World Ahead of Kyoto Emissions Targets," New Scientist, November 19, 2008, at: <http://www.newscientist.com/article/mg20026833.400-world-ahead-of-kyoto-emissions-targets.html>

“common but differentiated responsibility,” the Convention stipulated different obligations for different countries, depending primarily on their level of development and industrialization. The specific obligations for each country are laid out in Annexes to the Convention.

See Chapter 9 of this book on the UN Framework Convention on Climate Change.

Convention on Biological Diversity

The UN Convention on Biological Diversity (CBD)* was a watershed event in the conservation of biological diversity, the sustainable use of biological resources, and the equitable sharing of benefits from the use of those resources. The objectives of the CBD are “the conservation of biological diversity, the sustainable use of its components, and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources, including, by appropriate access to, genetic resources and by appropriate transfer of relevant technologies, taking into account all rights over those resources and to technologies, and by appropriate funding.”† Prior to Rio, interest had been mounting in finding a way to protect the Earth’s biological resources and stem problems associated with species extinction and harm to supporting ecosystems. As a result, the United Nations Environment Programme (UNEP) in November 1988 convened the Ad Hoc Working Group of Experts on Biological Diversity to explore the need for an international CBD.‡ At Rio, on June 5, 1992, the Convention was opened for signature and by June 4, 1993 had received 168 signatures. It entered into force on December 29, 1993 and was ratified on December 30, 1993, only 90 days after the 30th ratification, making it one of the most rapidly implemented environmental treaties ever.

The CBD adheres to three main objectives; the conservation of biological diversity, the sustainable use of the components of biological diversity, and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources.§ It offers broad guidelines for national-level protection of biological diversity and requires the formulation of national biodiversity strategies. As well, the Convention acknowledges the importance of national sovereignty over biological resources and the need for prior informed consent (PIC) prior to the transfer of resources out of a country. The CBD also stipulates that biodiversity use must be sustainable and that benefits from such use must be equitably shared between the source and receiving countries (French, 2002).

* Full text of the *UN Convention on Biological Diversity* is available from the CBD Secretariat. Web site at: <http://www.cbd.int/doc/legal/cbd-un-en.pdf>. As set out in Art. 2, “Biological diversity” refers to “the variability among living organisms from all sources including, *inter alia*, terrestrial, marine and other aquatic ecosystems and the ecological complexes of which they are part: this includes diversity within species, between species and of ecosystems,” whereas “biological resources” refers to any “genetic resources, organisms or parts thereof, populations, or any other biotic component of ecosystems with actual or potential use or value for humanity.”

† *UN Convention on Biological Diversity*, *supra*, Article 1.

‡ Secretariat of the UN Convention on Biological Diversity, at: <http://www.cbd.int/history/>

§ From the Convention on Biological Diversity, at: <http://www.cbd.int/convention/about.shtml>

Since the coming into force of the Convention, one protocol to the CBD has been adopted. The *Cartagena Protocol on Biosafety** was adopted in 2000, with the objective of governing the movements of living modified organisms (LMOs) resulting from modern biotechnology, from one country to another. It entered into force on 11 September 2003 and essentially allows nations the choice whether to allow imports of products containing genetically modified organisms.

Agenda 21

Due to the unwieldy size of *Agenda 21* (nearly 300 pages) and the need for reporters at the Earth Summit to communicate news of the plan quickly, the UN issued a 45-page “*Agenda 21—Press Summary*” that provides a very useful review. Thus, the brief review of the key chapters relating to chemicals and hazardous wastes—namely, Chapters 19, 20, 6, and 8—makes extensive reference to that document. *Agenda 21*, a title derived from “Agenda for the 21st Century” (Sandbrook, 1997), is a wide-ranging action plan for implementing the principles in the Rio Declaration, the objectives articulated in the other Rio agreements, and a comprehensive plan for attaining the objectives of environmental protection and sustainable development.[†] *Agenda 21* covers an enormous number of global concerns, spelling out in great detail paths for improving the state of affairs for each one. Philippe Sands observes that taken together, the 40 chapters of *Agenda 21* “constitute the framework for international law in the field of sustainable development” (Sands, 2003, p. 11). UNCED Secretary-General Maurice Strong characterized *Agenda 21* as “. . . the broadest consensus ever achieved on a text and is a *political commitment* prior to a legal commitment” (UNCED, 1992).

Agenda 21 addresses four program areas: (1) Social and Economic Dimensions, (2) Conservation and Management of Resources for Development, (3) Strengthening the Role of Major Groups, and (4) Means of Implementation. The text of each program area describes the rationale for the actions prescribed, the objectives sought, and specific activities and means of implementation. The plan “sets out the objective for achieving sustainable development by the 20th century, sector by sector: how to act to protect the atmosphere, slow down deforestation, stop the erosion of arable land, protect the ocean and marine resources, protect fresh water and achieve better management to prevent disease, take account of waste management (nuclear, toxic, chemical or dangerous)” (UNCED, 1992). It covers a wide range of issues including conservation and resource management (e.g., atmosphere, forests, water, waste, chemical products), socioeconomic concerns (e.g., human habitats, health, demography, consumption and production patterns, etc.), the strengthening of NGOs other social groups such as unions, women, youth, and funding mechanisms and other means of implementation.

As mentioned earlier, several chapters in *Agenda 21* served and continue to serve as the foundation for a number of international legal instruments, policies, and regimes in the area of chemical and hazardous waste management. Chapter 19, titled

* Full text on the CBD, at: <http://www.cbd.int/doc/legal/cartagena-protocol-en.pdf>

† The full text of *Agenda 21* is available on the Commission for Sustainable Development, at: http://www.un.org/esa/dsd/agenda21/res_agenda21_00.shtml

the “Environmentally Sound Management of Toxic Chemicals, Including Prevention of Illegal International Traffic in Toxic & Dangerous Products,” is critical in this regard, but Chapter 20 (“Environmentally Sound Management of Hazardous Wastes, Including Prevention of Illegal International Traffic in Hazardous Wastes”), Chapter 6 (“Protecting and Promoting Human Health”), and Chapter 8 (“Integrating Environment and Development in Decision-making”) also play important roles. We will look very briefly at the key features of these chapters.*

Chapter 19, titled “Environmentally Sound Management of Toxic Chemicals, Including Prevention of Illegal International Traffic in Toxic & Dangerous Products” and presented in Section II of *Agenda 21*, recognizes that chemical contamination can be a source of “grave damage to human health, genetic structures and reproductive outcomes, and the environment.”† This chapter specifically addresses the special challenges and needs of developing countries in managing toxic chemicals. Additionally, the treatment acknowledges that many countries lack national systems to cope with chemical risks, and/or the scientific means of collecting evidence of misuse and of judging the impact of toxic chemicals on the environment.‡

Chapter 19 sets out the following six program areas: expanding and accelerating international assessment of chemical risks; harmonization of classification and labeling of chemicals; information exchange on toxic chemicals and chemical risks; establishment of risk reduction programs; strengthening of national capabilities and capacities for management of chemicals; and prevention of illegal international traffic in toxic and dangerous products.§ These six program areas involve, to varying degrees, “hazard assessment (based on the intrinsic properties of chemicals), risk assessment (including assessment of exposure), risk acceptability and risk management.”¶

As mentioned earlier, Chapter 19 has played a critical role in the design of several important international chemical and toxics conventions and instruments, including the Strategic Approach to International Chemical Management (SAICM; see Section IV of this book). Similarly, Chapter 21 provided the impetus for the establishment in 1994 of the Intergovernmental Forum on Chemical Safety (IFCS, see Section V, Chapter 21 of this book), a forum that proved to be very useful to many country officials tasked with managing toxics in their countries. Chapter 21 also influenced the UN’s GHS initiative facilitating a standardized, global system for classifying and labeling chemicals. The GHS was first published in 2003 (see Section III, Chapter 11 of this book).

* The United Nations conveniently issued a 45-page Press Summary of *Agenda 21*, and since it provides a more accessible presentation of *Agenda 21* (the full document comprises nearly 300 pages and a laborious format), our examination of the key chapters relating to chemicals and hazardous wastes (namely, Chapters 6, 8, 19, and 20) makes use of and rests on the summary. The Press Summary is available online at: http://www.un.org/esa/sustdev/documents/agenda21/english/A21_press_summary.pdf

† Chapter 19, para. 2.

‡ UN, *Agenda 21* Press Summary, at: http://www.un.org/esa/sustdev/documents/agenda21/english/A21_press_summary.pdf

§ Chapter 19, para. 4.

¶ Ibid., para. 5.

Chapter 20, titled “Environmentally Sound Management of Hazardous Wastes, Including Prevention of Illegal International Traffic in Hazardous Wastes” and presented in Section II of *Agenda 21*, recognizes that effective controls over the generation, storage, treatment, recycling and reuse, transport, recovery, and disposal of hazardous wastes is critical for the protection of human health, the environment, effective natural resource management and sustainable development in general.* The chapter promotes integrated life-cycle management and states that “the overall objective is to prevent to the extent possible, and minimize, the generation of hazardous wastes, as well as to manage those wastes in such a way that they do not cause harm to health and the environment,”† through an integrated approach to hazardous waste management.

Among other things, the chapter highlights the importance of and need for international cooperation in a variety of areas, including but not limited to the dissemination of information on risks and new technologies for reducing production of hazardous wastes, improvement of methods for handling and disposal of hazardous wastes, design and development of individual nations’ hazardous waste programs and centers, and the importance of cooperation in controlling transboundary shipping.‡ Indeed, the impetus for this chapter came in no small part from concern about illegal international movement of hazardous wastes, in contravention of existing national legislation and international legal instruments, and thus it includes specific recommendations for reducing illegal traffic in toxic and dangerous wastes.§ In response to these concerns, Chapter 6, described below, proposes a ban on the export of wastes to nations that cannot demonstrate the capacity to deal with them in an environmentally sound fashion (see Section III, Chapter 8 of this book).

Chapter 6 of *Agenda 21*, *Section I*, titled “Protecting and Promoting Human Health,” looks at the task of protecting and promoting human health from two angles: while development activities often affect the environment in ways that cause or exacerbate health problems, it is equally true that a lack of development can and frequently does affect human health in negative ways. Thus, proposals in this chapter focus on issues such as “meeting primary health care needs, controlling communicable diseases, coping with urban health problems, reducing health risks from environmental pollution, and protecting vulnerable groups such as infants, women, indigenous peoples and the very poor.”¶

Acknowledging the link between waste generation and its risk to human health, Chapter 6 also advocates increased use of health risk assessments, particularly in large cities, and emphasizes preventative as opposed to simply damage control measures in order to reduce man-made disasters, such as those involving toxic

* Chapter 20, para 1.

† Chapter 20, para. 6.

‡ UN, *Agenda 21* Press Summary, at: http://www.un.org/esa/sustdev/documents/agenda21/english/A21_press_summary.pdf

§ Chapter 20, para 5.

¶ UN, *Agenda 21* Press Summary, p. 6, at: http://www.un.org/esa/sustdev/documents/agenda21/english/A21_press_summary.pdf

wastes or other industrial by-products.* Chapter 6 also recommends various actions for minimizing the pollution hazards in workplaces and individual dwellings, including but not limited to development of pollution control technologies for air and water pollution (including indoor air), limiting the use of pesticides, and promoting the introduction of environmentally sound technologies in the industry and energy sectors.†

Chapter 8, titled “Integrating Environment and Development in Decision-making” and presented in Section 1 of *Agenda 21*, focuses on effective environmental decision-making, and calls upon governments to explore how, through cooperation between government and business and industry, effective use can be made of economic instruments and market mechanisms in connection with a variety of issues, including waste management.‡ The chapter proposes the “full integration of environmental and developmental issues for government decision-making” on a variety of policies affecting environment and development, and encourages governments to seek a broader range of public participation.§ It underscores the need for comprehensive information-gathering activities and improved assessment of environmental risks and benefits.¶ Of particular relevance for the area of chemical and hazardous wastes, the chapter also underscores that environmental costs should be incorporated in decisions made by producers and consumers alike, and that prices should, among other things, contribute toward preventing environmental degradation.**

The massive scope of *Agenda 21* as a plan was matched only by the enormous challenge of how to fund its programs and initiatives. Following Rio, it was stated that “in order to achieve the objectives set out in *Agenda 21*, the United Nations estimates that 600 billion Dollars a year would need to be invested until the year 2000, that is US\$ 125 billion from international aid coffers. Until the opening of the Conference, roughly 55 billion Dollars was being provided each year by way of Official Development Aid (ODA)” (UNCED, 1992). In the end, however, the industrialized nations “failed to agree on the much-touted objective of devoting 0.7% of their GNP to ODA by the year 2000” (UNCED, 1992).

In the years following Rio, the massive action plan represented by *Agenda 21* received a great deal of attention and thought. In the context of the five-year review of progress made after Rio, mandated by the UNGA and held by the UN in 1997 in New York City, a Resolution was adopted that outlined the progress—or lack

* The Global Development Research Center, “Waste Management in *Agenda 21*,” at: http://www.gdrc.org/uem/waste/waste_in_agenda21.html

† UN, *Agenda 21* Press Summary, at: http://www.un.org/esa/sustdev/documents/agenda21/english/A21_press_summary.pdf

‡ The Global Development Research Center, “Waste Management in *Agenda 21*,” at: http://www.gdrc.org/uem/waste/waste_in_agenda21.html

§ UN, *Agenda 21* Press Summary, p. 9, at: http://www.un.org/esa/sustdev/documents/agenda21/english/A21_press_summary.pdf

¶ UN, *Agenda 21* Press Summary, p. 9, at: http://www.un.org/esa/sustdev/documents/agenda21/english/A21_press_summary.pdf

** UN, *Agenda 21* Press Summary, at: http://www.un.org/esa/sustdev/documents/agenda21/english/A21_press_summary.pdf

thereof—on Rio objectives.* It was replete with somber statements highlighting the need for renewed efforts, such as the following:

Five years after the United Nations Conference on Environment and Development, the state of the global environment has continued to deteriorate, as noted in the Global Environment Outlook of the United Nations Environment Programme, and significant environmental problems remain deeply embedded in the socio-economic fabric of countries in all regions.

Having admitted the serious nature of the environmental, social, and economic problems that remained after Rio, the UN General Assembly concluded that the primary problem in realizing Rio's goals and objectives lay with implementation. Thus, in a supplemental planning document, the "Programme for Further Implementation of *Agenda 21*," it tried to address how to implement a plan of such great proportions and ambitions.† That plan promised renewed and vigorous efforts but failed to make serious inroads on improving the human or environmental situation.

Agenda 21 has continued to be the focus of much discussion and reflection at subsequent environment and development summits, such as the World Summit on Sustainable Development (WSSD) held in Johannesburg, South Africa from August 26 to September 2002. (An examination of the WSSD is found in Section II, Chapter 4 of this book.) More importantly, however, progress on *Agenda 21* continues to be the focus of the inter-governmental organization created to track and facilitate its implementation: the UN Commission on Sustainable Development (CSD). The work of the CSD is summarized later in this chapter.

Convention to Combat Desertification

As mentioned earlier, the Convention to Combat Desertification was not actually adopted at Rio, but could certainly be said to have taken root there since it was at Rio that the initial steps to create the Convention were made. This agreement targeted four regions: Africa, Asia, Latin America and Caribbean, and the Northern Mediterranean, encouraging each region to design and implement a plan for halting desertification that would recognize and work within specific regional needs. National and subregional action plans were also encouraged. The Convention was adopted in June 1994 and entered into force in December 1996, three months after receiving the 50th ratification.‡

At UNCED, the question of how to approach the serious problem of desertification was a major concern, and, largely at the insistence of the African countries, "the Conference supported a new, integrated approach to the problem, emphasizing action to promote sustainable development at the community level" and called upon the UNGA to establish an Intergovernmental Negotiating Committee Desertification

* UN General Assembly Resolution A/RES/S-19/2, September 19, 1999, at: <http://www.un.org/documents/ga/res/spec/aress19-2.htm>

† UN General Assembly Resolution A/RES/S-19/2, September 19, 1999, paragraph 9.

‡ Full text available on the Web site of the Secretariat for the Convention to Combat Desertification, at: <http://www.unccd.int/convention/text/convention.php>

(INCD), with the goal of preparing, by June 1994, a Convention to Combat Desertification, particularly in Africa. The General Assembly agreed, and in December 1992 adopted Resolution 47/188, which created the INCD.* Following a series of five negotiating sessions over the next two years, the Convention was adopted in Paris on June 17, 1994. It entered into force on December 26, 1996.

ORGANIZATIONS AND INSTITUTIONS ESTABLISHED OR RESTRUCTURED

Rio can be said to have led, directly or indirectly, to the creation of numerous inter-governmental and nongovernmental agencies focused on environment, energy, and sustainable development. That said, only a few were specifically created to function as follow-up mechanisms to the Earth Summit: the Commission on Sustainable Development; Inter-agency Committee on Sustainable Development; High-level Advisory Board on Sustainable Development; World Business Council on Sustainable Development (WBCSD).†

Commission on Sustainable Development

The creation of the CSD was envisioned in *Agenda 21* and executed by the UN General Assembly following Rio through the adoption on Jan 29, 1993 of Resolution A/RES/47/191 establishing the CSD.‡ It was created in December 1992 to ensure effective follow-up of UNCED. The Commission was created in December 1992 to ensure effective follow-up of UNCED, to monitor and report on implementation of the agreements at the local, national, regional, and international levels. It was agreed that a five-year review of Earth Summit progress would be made in 1997 by the United Nations General Assembly meeting in a special session.§

The CSD operates as a functional commission of the UN Economic and Social Council (ECOSOC). Its role includes: (1) the review of progress at the international, regional, and national levels in the implementation of recommendations and commitments contained in *Agenda 21*; (2) the elaboration of policy guidance and options for future activities to achieve sustainable development; and (3) the promotion of dialogue and partnership building for sustainable development with governments, the international community, and major groups identified in *Agenda 21*.

A “High-level Advisory Board on Sustainable Development” was formed at Rio to oversee the work of the CSD and provide guidance on issues related to the implementation of *Agenda 21*. The Board was also tasked with the responsibility of providing expert advice to the UN Secretary General, the CSD, the Economic and Social Council, and the General Assembly.¶

* UN General Assembly Resolution A/RES/47/188, December 22, 1992, full text available at: http://www.unccd.int/convention/history/GAres47_188.php

† <http://www.un.org/geninfo/bp/enviro.html>

‡ <http://www.un.org/documents/ga/res/47/ares47-191.htm>

§ UN CSD, at: http://www.un.org/esa/dsd/csd/csd_aboucscd.shtml

¶ UNGA Resolution A/RES/47/191, January 29, 1993, article 30, at: <http://www.un.org/documents/ga/res/47/ares47-191.htm>

Interagency Committee on Sustainable Development

Another organization whose launch was made official at the Rio Conference was the Interagency Committee on Sustainable Development (IACSD), an intergovernmental organization designed to facilitate coordination between various agencies and on a number of initiatives and programs.

According to a description of IACSD by UNEP, the agency structure involved a system of task managers set up for thematic areas, and it was UNEP that served as task manager for toxic chemicals and hazardous wastes (along with atmosphere, desertification and drought, and biodiversity).^{*} The IACSD was decommissioned in October 2001, when the UN decided to replace it with other coordinating bodies within the UN.[†]

See also Chapter 23 of this book on the IOMC.

World Business Council on Sustainable Development

NGOs of all types were created in anticipation of the Earth Summit and many more emerged in the years following the event, but among the most powerful of these groups is the business and industry organization known as the World Business Council on Sustainable Development (WBCSD). The WBCSD is a CEO-led, international association of now more than 200 business concerns, having as its mission “to provide business leadership as a catalyst for change toward sustainable development, and to support the business license to operate, innovate and grow in a world increasingly shaped by sustainable development issues.”[‡] In the run-up to Rio, Secretary General Maurice Strong invited Swiss industrialist Stephan Schmidheiny to coordinate the business participation in the Summit, specifically to “involve business in sustainability issues and give it a voice in the forum.”[§] Following the Summit, Mr Schmidheiny and number of his colleagues launched the WBCSD, and after merging with the World Industry Council on the Environment in 1995, opened a secretariat in Geneva, Switzerland.[¶] Today, the WBCSD wields strong influence in the area of national and international sustainability policy.

See also Chapter 20 of this book on ICCA.

Restructuring of the Global Environment Facility

Originally established in 1990 as a pilot program of the World Bank (Sjoberg, 1999), the Global Environment Facility (GEF) was substantially reformed and restructured following Rio. The GEF serves as a funding source and funding mechanism serving primarily to assist developing countries in finding the means they require to implement programs that help protect the global environment. In its own words, the GEF is currently the “largest funder of projects to improve the global environment.”^{**}

At Rio, during last-minute negotiations on financial agreements relating to *Agenda 21*, a strong consensus developed on the need to restructure the GEF, addressing to

^{*} UNEP, New York Office, at: <http://www.nyo.unep.org/emg2.html>

[†] UNEP, New York Office, at: <http://www.nyo.unep.org/emg2.htm>

[‡] World Business Council on Sustainable Development, at: <http://www.wbcsd.org/>

[§] Ibid.

[¶] Ibid.

^{**} GEF, at: <http://www.thegef.org/gef/whatisgef>

calls from developing countries for increased financial resources and concerns about how aid was being limited by donor countries who argued that sustainable development aid should not be considered separately from standard development aid. Various actors, including the European Community, lobbied to replenish the GEF with fresh and additional resources for specific *Agenda 21* programs, and ultimately, the decision was made to move the GEF out of the World Bank and let it operate as an independent and permanent organization, but it was not executed until some two years later.*

As the GEF notes, at Rio, “the decision to make the GEF an independent organization enhanced the involvement of developing countries in the decision-making process and in implementation of the projects.”† But in 1994, when the GEF was officially made a permanent entity, the new arrangement made the World Bank the Trustee of the GEF Trust Fund—a move which did not represent the kind of independence that those calling for reform at Rio had had in mind. This led a number of observers to question the integrity and effectiveness of the GEF, arguing that the World Bank, through myriad activities, has assisted a number of environmentally destructive projects over the years (see, e.g., Chatterjee and Finger, 1994). On the other hand, it was through the restructuring at Rio that the GEF came to serve as the financial mechanism for various multilateral environmental agreements.

See also Chapter 49 of this book on Global Financial Instruments.

DIRECT IMPACTS OF THE RIO EARTH SUMMIT: SUCCESSES AND SHORTCOMINGS

Since 1992, the Rio Earth Summit has been the subject of extensive review, analysis, and critique. Indeed, entire books have been devoted to the subject (see, e.g., Haas, 1992, pp. 6–11; Sandbrook, 1992; Grubb et al., 1993; Chatterjee and Finger, 1994; Middleton et al., 1994; Freestone, 1994; Pallemmaerts, 1994; Porras, 1994). In his 1997 essay reviewing progress on Rio objectives after five years, Richard Sandbrook states:

Anyone setting out to give a global assessment of progress since the events in Rio in 1992 could well be considered as either a fool, or arrogant or both. There is so much one could report on and in so many places that the task seems absurd. So all that can be done is to attempt a comparison of expectations then with realities now. Hardly a scientific exercise based on empirical research to be sure (Sandbrook, 1997).

This caution is even truer today, nearly 20 years after the Earth Summit. Thus, it is not the intention of the current chapter to provide a comprehensive synthesis of all such examinations and critiques to date. Nonetheless, what is offered here is a brief identification and description of some of the common themes and threads running throughout earlier assessments of Rio.

* The GEF, at: <http://www.gefweb.org>

† The GEF, at: <http://www.thegef.org/gef/whatisgef>

Prior to engaging in that exercise, however, one critical albeit obvious point must be made about evaluations of the success or failure of Rio: nearly all evaluations of the Rio Earth Summit are strongly influenced by, if not a product of, the theoretical and/or political paradigms of the author engaging in the analysis. Thus, for example, commentators who follow the thinking that growth and development lead inexorably to environmental disturbance and degradation, report that the Earth Summit was, by and large, a failure for the environment and a great success for business and industry, which artfully managed to turn public and political attention away from problems caused by industrialization (pollution, depletion of natural resources) and toward the many human benefits to be found in development (e.g., Chatterjee and Finger, 1994). On the other hand, commentators who believe that “sustainable development” is a truly laudable concept, containing the seeds for the dual existence of prosperity and environmental integrity, view the Earth Summit as a success—even if the primary contribution of the Summit was simply dissemination and popularization of the idea of “sustainable development” (e.g., Dernbach, 2002).

But these disparate and wide-ranging views on successes and failures are, themselves, an indication that, despite being heralded as an event that brought many people from many areas of the world and many walks of life together to work on common problems, the Rio Earth Summit was not truly a unifying event. On the contrary, some have argued that, “[i]n effect, existing positions were polarized at Rio by the experience of meeting together under the media spotlight, not reconciled” (Seyfang and Jordan, 2002). Similarly, those whose interests were most served by the Summit—some would say business and/or northern hemisphere environmental organizations (see, e.g., Chatterjee and Finger, 1995)—tended to look back at the Summit with fonder memories than those who felt they left with little or nothing, namely, many of the poorer countries of the Southern hemisphere, or more accurately, the civil society groups and organizations within them.

Given the context just described, the present description of Rio’s successes and failures takes as its starting point the simple question whether the Summit succeeded or failed in realizing the specific objectives articulated by the General Assembly when UNCED was provided with its original mandate (these objectives are summarized in the section “Rio Earth Summit Goals and Objectives”). Thus, the analysis below reviews briefly how the Earth Summit fared as measured against these objectives. It would be disingenuous, however, to end the analysis there, since many commentators in the years following Rio have offered enlightening and useful views on the Summit’s impact which go beyond the question of whether it met its stated objectives. Thus, the analysis below also outlines in summary fashion some of the most frequently cited “successes” and “failures” of the Rio Summit identified by commentators over the years.

SUCCESSES . . . WITH CAVEATS

Rio’s Success in Light of Its Official Objectives

Measured against the fundamental aims in its primary stated objectives as outlined in UNGA Resolution 44/288 (see the section “Rio Earth Summit Goals and Objectives”),

Rio was, on the whole, a solid success. Simply put, this is because the stated objectives, not surprisingly, tend to be objectives mandating examination, study, policy development, the identification of problems and solutions, and the promulgation of recommendations and plans. Thus, the objective requiring the Earth Summit “to examine the state of the environment” and the changes that occurred after the Stockholm Summit, was clearly met: many scientific reports covering the gamut of environmental issues were made available and studied at the Summit. Similarly, the objective of recommending measures to “protect and enhance the environment through the development and implementation of policies for sustainable and environmentally sound development” was largely met by *Agenda 21*, a hugely detailed action plan. Another stated objective, promoting the “further development of international environmental law,” was also fulfilled via the negotiation and completion of the two conventions (UNFCCC and CBD), the Statement of Forest Principles, and the Rio Declaration. While the later two were not binding legal agreements, they still exert legitimate influence in international environmental law as “soft law.” Rio also succeeded to some extent in examining ways and means of furthering cooperation between neighboring countries, if only by providing a context for neighboring countries to begin dialogues with each other about common problems and cross-border issues. As well, the Earth Summit certainly was successful in examining “the relationship between environmental degradation and the international economic environment” though it certainly cannot be said that such examination led to anything resembling a consensus. Finally, it can be argued that, through its production of *Agenda 21*, and through negotiations to restructure the GEF,* the Earth Summit succeeded at least in part in examining “strategies for national and international action” aimed at promoting a “supportive international economic climate conducive to sustained and environmentally sound development.”

We now turn to some of the “successes” and “shortcomings” commonly ascribed to the Earth Summit, restating the fact that most evaluations of Rio did not seek to measure its results against its official objectives.

Awareness Raised on Environment, Development and the Connection between the Two

As the delegates at Rio carried out their examination of the state of the environment and the changes since Stockholm, a task named among the Summit’s stated objectives, media reports echoed the findings to the world, resulting in one of the most massive awareness-raising events to date. The articulation of the various environmental and human problems plaguing the planet to an audience that was as broad in its socioeconomic status as it was in its geographic distribution, counts as a milestone in the history of environmentalism. As Haas, Levy and Parsons point out, one of the most important contributions of the Earth Summit was the process used for consciousness raising at the summit and its subsequent popularization in society (Haas et al., 1992, pp. 28–29). Thus in Rio, those concerned with planetary problems used the Summit as a vehicle to “spread the word” about various issues to a global audience for the first time—an audience ranging from politicians and scientists to

* This topic is treated in detail in the section “Restructuring of the Global Environment Facility.”

poor, indigenous laborers, and third-world mothers. In short, one of the key tools used by environmental advocates, activists, and their opponents, to wit, education of the public, was utilized and popularized at Rio as never before.

While environment as an issue was certainly well-rooted prior to the Summit, it is undeniable that, as an event, Rio went farther in popularizing the environment as a *cause célèbre* than any event before or after. As Daniel Esty notes: "... perhaps most important, the 1992 Earth Summit will be remembered for its remarkable role in worldwide environmental education" (Esty, 1993). While the 1972 Stockholm Summit "served to educate governmental elites around the world about environmental issues," the Earth Summit at Rio "was an event of the masses" (Esty, 1993).

Even within months of the end of the Rio Summit, some experts stated that Rio would be "much less remembered for the agreements produced and much more remembered for the symbolic emergence of the environment as a global issue of first-order importance," and that the Summit would "be seen as establishing irrevocably the connection between environmental protection and economic growth" (Esty, 1993).

Rio also made clear and popularized the notion that specific environmental issues such as forestry, endangered species, oceans, and atmosphere were highly interconnected, and that inevitably in the course of coping with problems faced in one area, problems in other areas would arise.

Formalization and Popularization of Concept of Sustainable Development

If the Earth Summit did nothing else, it propelled the concept of "sustainable development" into the spotlight of public attention, and ultimately injected the concept into common parlance and thought (see, e.g., Koh, 1997; Dernbach, 2002). Since Rio, the number of agencies, organizations, NGOs, and associations, as well as corporate and government policies organized around or supporting "sustainable development" is truly staggering. But today, even as at Rio, it is clear that not everyone thinks about the same thing when speaking about the concept. Some see sustainability as the essential idea in that concept, viewing development as something that must be carefully tempered, even constrained, by the need to ensure that the environment is not harmed in a permanent way. Hence, development practices having negative impacts on the environment are not "sustainable" practices, in that they are not reconcilable with the realities of the planet's finite resources and human demands on "the commons." Others, however, view the controlling term in the concept of "sustainable development" as development: taking the view that the environment is a resource to be used in the pursuit of prosperity (or simply climbing out of poverty), but a resource to be used carefully and efficiently, so that it may remain available for development for future generations as well as the present.

Indeed, much has been written about the various often conflicting meanings ascribed to the term "sustainable development" (see, e.g., Stone, 1993, 1994), and it is certainly not within the scope of the present discussion to develop this point. Rather, the point to be made here is that the lack of consensus on the meaning of sustainable development today, or what could also be described as a case of severe "mission drift" from the notion as it was originally expressed in the Brundtland

report,* is something that can be traced back to the Earth Summit.[†] Thus, despite whatever notions people had about the concept on the way to Rio, by the end of the Summit most observers of the event, on and off site, understood that while the term “sustainable development” was not something that necessarily put the environment—or people, for that matter—first, the exact definition and how to operationalize the concept remained elusive. As such, while Rio made “sustainable development” a household word, it also left a legacy of confusion over the concept, or at least a situation in which the term is used by different constituencies to serve competing objectives.

No matter what view or attitude one takes about the concept of sustainable development, it remains an undeniable fact that the Earth Summit at Rio was responsible for rooting this concept firmly and deeply in the mind of conference-goers and the public alike. As testimony to the enduring nature of the concept, one of the aims announced for the “Rio Plus 20” Summit in 2010 was to renew political commitment toward, and the public’s interest in sustainable development (see, e.g., UN Department of Public Information, Background Release, 2010). The themes of that Summit will be: building a green economy and an institutional sustainable development framework.

Launching and Popularization of the Notion of Sustainable Consumption

One recent and comprehensive review emphasized that, the notion of sustainable consumption was largely born and made popular at the Rio Earth Summit (Jackson and Michaelis, 2003). As Tim Jackson and Laurie Michaelis observe:

The term sustainable consumption itself can be dated more or less to Agenda 21—the main policy document to emerge from the Rio Earth Summit in 1992. Chapter 4 of Agenda 21 was entitled “Changing Consumption Patterns.” It called for “new concepts of wealth and prosperity which allow higher standards of living through changed lifestyles are less dependent on the Earth’s finite resources.” In so doing, it provided a potentially far-reaching mandate for examining, questioning, and revising consumption patterns—and, by implication, consumer behaviours, choices, expectations and lifestyles. (Jackson and Michaelis, 2003, p. 2)

Unfortunately, the enthusiasm and sincerity with which the concept of sustainable consumption was originally discussed waned significantly in later years. Taylor and Michaelis observe that this decline stemmed in no small part from disagreement over whether the concept implied “consuming more efficiently, consuming more responsibly, or quite simply consuming less,” and that because of this variability, “. . . by the time of the second Earth Summit in 2002, many of the organizations who had grasped the dialogue on sustainable consumption so enthusiastically began to distance themselves from its more radical implications. Some of them dropped it completely” (Jackson and Michaelis, 2003, p. 3).

* [S]ustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs (World Commission on Environment and Development, 1987).

[†] For a thorough discussion of the confusion over the term “sustainable development” in the early 1990s, on the heels of the Earth Summit, see Christopher D. Stone (1993–1994).

Today, the concept of sustainable consumption as treated by international agencies such as UNEP, is understood to mean consuming differently and efficiently, not necessarily consuming less (Jackson and Michaelis, 2003, p. 3). Nonetheless, the noting of consuming less has retained its significance in certain circles with namely, with environmentalists, as witnessed by the huge popularity of *The Story of Stuff* on the internet—an animated documentary about the origins and ultimate impacts of consumerism.*

Multiple International Agreements and High Level of Political Commitment

As highlighted earlier, perhaps one of the features of the Rio Summit that has led many to color the event as a success is the fact that with three major international agreements (the UNFCCC, CBD, and Forest Principles), as well as a set of guiding principles (the Rio Declaration) and a detailed action plan (*Agenda 21*), Rio can easily be described as the most prolific global environmental summit to date. Certainly, any number of problems may be identified in the structure, scope, wording and/or implementation of these documents, and one may criticize the fact that the Forest Principles and Rio Declaration were nothing more than political commitments to sets of principles, but given the long and arduous process involved in the negotiation and signing of treaties and other agreements (see, e.g., Firestone),[†] it is still remarkable that Rio was able to produce final products from five separate sets of negotiations. Furthermore, the power of achieving unified political commitment on issues must not be overlooked: political commitment is always a necessary precursor to the conclusion of full-fledged, legally binding treaties. On the level of political commitment, Rio was successful. In his 1997 critique of Rio, Richard Sandbrook, states, “On balance, the Earth Summit in 1992 can still be seen as a high point of political commitment to solving global environment and development problems” (Sandbrook, 1997).

Mobilization and Coalition Building within Civil Society

A number of commentators and observers of the Rio event have pointed to the role of the Summit in mobilizing ever greater numbers and types of people to the causes of environmental protection and/or sustainable development (see, e.g., Haas, 1992, p. 28). In contrast to the earlier conference at Stockholm, the Earth Summit provided the context for an unprecedented number of civil society groups to meet face-to-face and network on an enormous variety of topics, from environment and natural resources, to energy, poverty, population, and education, to name just a few. The event provided civil society attendees with a valuable opportunity to learn about issues other than their own, to see the connections among issues, and to lobby each other (often as much as they lobbied Summit delegates) in an effort to broaden their circles of influence. As such, Rio launched an era of coalition-building among and within the various interests represented by civil society groups that continues to this day.

* Short film by Annie Leonard, launched online December 2007, at: <http://www.storyofstuff.com/international/>. *The Story of Stuff* Web site claims that since the film's launch, it has been viewed by millions of people in more than 224 countries and territories.

[†] Firestone mentions that negotiation and conclusion of treaties is typically a multiyear exercise: Witness the Law of the Sea Convention, which took nine years to conclude. Ibid.

The Summit also significantly raised the profile and status of civil society organizations in the eyes of governments and international agencies. Despite the fact that the vast majority of NGOs were corralled toward the “alternative venue” a number of miles away from the main summit proceedings, the Earth Summit gave credibility to these groups in a way that ultimately served to strengthen the position of NGOs in relation to formal UN processes, both to the media and to the public as well. In 1993, Esty wrote: “Never have representatives of so many nongovernment [sic] organizations (NGOs) attended a major international event, presenting such a broad array of views and perspectives” (Esty, 1993).

Creation of the Commission on Sustainable Development and National Reporting

As mentioned earlier, the CSD grew out of recommendations in *Agenda 21* (Esty, 1993, Chapter 38) that there should be an international agency charged with monitoring and reporting on progress on *Agenda 21* objectives, implementation of the agreements made at Rio and implementation of sustainable development goals generally. The creation of the CSD may be considered a successful outcome of Rio because the CSD still functions today as a permanent UN body dedicated to the pursuit of sustainable development objectives and the implementation of *Agenda 21*. More importantly, it collects information on national plans and progress on implementing sustainable development, and periodically issues summary reports about worldwide progress within specific thematic areas, based on the reports from participating countries. The information CSD collects comes to it largely by way of the CSD’s National Reporting system, under which countries submit periodic reports to the CSD on their progress within the thematic areas. While the program is strictly voluntary, many countries opt to report on the status of sustainable development within their borders.

The “birds-eye view” that the CSD enjoys by virtue of examining the national reports allows it to make some very important observations. In the spring of 2010, for example, the CSD was able to conclude the following after reviewing the latest crop of national reports on the topics of sustainable consumption and production, chemicals, mining, transport, and waste management:

Only a few countries have managed to weaken the link between economic activity and resource extraction, pollution and waste generation. The projected growth in population, income and wealth over the next 40 years is expected to put increasing pressure on resources. If rising middle classes of emerging economies were to emulate the consumption patterns of rich countries, two planets would be needed by 2040. (UN Commission on Sustainable Development, Press Release, 2010)

Such reports and pronouncements obviously have an important role to play in keeping critical environmental and development issues in the public eye.

SHORTCOMINGS

In general, criticisms of Rio far outnumber instances of praise. As Paul Harris stated, in a 1996 examination of equity and international environmental institutions:

Many assessments of the Earth Summit have been written and almost as many are negative. There is almost an endless supply of skepticism regarding the ability of the institutions emanating from UNCED to produce significant environmental benefits. (Harris, 1996, p. 294)

Further, Najam Adil, states in “The View from the South: Developing Countries in Global Environmental Politics”: “Rio’s legacy probably owes as much to the many disappointments since that conference as it does to its actual achievements” (Najam, 2005, p. 234). Indeed, the criticisms and complaints made about Rio since 1992 are too numerous to afford a full accounting—or even a brief mention of each one. That said, it is possible to identify certain themes that occur with some frequency among evaluations and critiques of the Earth Summit’s process, products, and general impact. These themes are addressed briefly below.

North–South Tensions

Many authors have highlighted the conflicts at the Earth Summit between Northern and Southern hemisphere constituencies, as well as the Summit’s failure to resolve them. Elizabeth R. DeSombre provides a succinct description of the fundamental issues in North–South tensions as they played out at the Rio Summit:

Developing countries were concerned that international environmental regulations would impact their ability to develop. They wanted acknowledgement that most of the damage to the global environment had been done by the developed countries, and assurance that they would not be preventing from developing and using the same technology their predecessors had. Developed states, on the other hand, wanted acknowledgement of the role of population growth in environmental degradation, and an equal allocation of responsibility for addressing environmental problems. (DeSombre, 2006, pp. 25–26)

The challenge for the Earth Summit was to try to find some way to bring the North and South to the table in a way that provided some movement toward a resolution of these differences. But it was not to be. As Gill Seyfang and Andrew Jordan state in their 2002 examination of environmental mega-conferences, “[a]s was the case with Stockholm, Rio conspicuously failed to reconcile the conflicting demands of industrialized and industrializing countries” (Seyfang and Jordan, 2002). In a 1997 essay, Richard Sandbrook even identified the failure to resolve the North–South dilemma as the key shortcoming of Rio:

But on balance, the Earth Summit in 1992 can still be seen as a high point of political commitment to solving global environment and development problems. What failed was the “bargain” that some sought at Rio: This was broadly that, in return for addressing the big environmental issues of climate change, biodiversity loss and deforestation, the wealthy world would help to finance, and support with technology, accelerated but “sustainable” development for the “South” (Sandbrook, 1997; Najam, 2002, pp. 46–50; Conca, 2005, pp. 127–128).*

* A number of authors have spoken about this “bargain”: see, for example, Adil Najam (2002) and Ken Conca (2005).

The lasting impact of the North–South difficulties at Rio is explained in cogent fashion by Adil Najam:

Much of the attention since UNCED has focused on the failure of the North to deliver the “goodies” that had been promised or implied at Rio—such as additional resources, technology transfers, and capacity building. Indeed, the inability of the North to fulfill these commitments has been a major contributor to the growing sense of malaise. However, the erosion of the conceptual building blocks of the Rio Bargain is an even more telling indictment of the fast deteriorating state of North–South relations. As the concept of sustainable development loses its policy edge, and as the key principles of additionality, common but differentiated responsibility, and polluter-pays are steadily eroded with each new [multilateral environmental agreement], the developing countries have a diminishing interest in staying engaged in these processes. These issues defined the *raison d’être* for the South’s engagement in global environmental negotiations. (Najam, 2002)

Whether or not the failure to reconcile North–South demands and interests was the primary problem with Rio, one thing is certain: this issue was linked to a number of other major shortcomings, as we shall see below.

Lack of Funding

New money for sustainable development programs—that was the rallying cry of developing countries at Rio, but it was a cry largely unheeded. As Andrew Jordan explains, from very early on, the developing countries made clear the need for the industrialized countries to offer substantial amounts of additional finances—that is, financial aid that was not simply to be redirected from previous programs or aid transfers from the North to the South (Jordan, 1994). This was known as the concept of “additionality,” and Jordan labels the finance issue in general and additionality in particular as “one of the most contentious issues raised” at Rio (Jordan, 1994).

The absence of funding necessary to carry out the enormously ambitious action plan in *Agenda 21* was clearly one of the most serious shortcomings of the Summit (see, e.g., Haas et al. 1992, pp. 26–27). Indeed, as Seyfang and Jordan mention, “little of the ‘new and additional’ money mentioned in *Agenda 21* for sustainable development in developing countries ever materialized” (Seyfang and Jordan, 2002/03 citing UNEP, 1999; United Nations, 2001). The funding problem was exacerbated by a global recession that was posing great challenges for the world economy at the time, and by already weak Official Development Assistance (ODA) (see, e.g., Haas et al., 1992, p. 26). Moreover, complaints were about waste, inefficiency and lack of inter-departmental coordination at the UN were on the rise. As Richard Sandbrook states: “... any evaluation of how well the UN and its family of agencies have done in following up on the Earth Summit are complicated by the general anti-UN environment that has developed in the OECD and elsewhere” (Sandbrook, 1997). However, part of the problem stemmed from the drafting of Chapter 33 of *Agenda 21*, the chapter dealing with measures for implementing the programs therein. According to Andrew Jordan, “Chapter 33 is an adroitly crafted diplomatic compromise that fails to bind anyone to anything” as all funding measures were essentially voluntary

(Jordan, 1994). Jordan also raises the noteworthy point that “the myriad actions prescribed in *Agenda 21* are neither prioritized nor properly costed” (Jordan, 1994). Given the larger dynamics at play in that era, however, it is easy to doubt whether drafting alone could have solved the problem.

Funding for environmental programs and sustainable development “was still a divisive issue at Rio Plus Five in 1997” (Long, 2000), and that trend has continued to the present day with no end in sight.

Weak or Unenforceable Agreements

Even shortly after the Earth Summit, the climate change treaty (the UNFCCC) was widely regarded as an agreement with no teeth, the Biodiversity agreement (the CBD) was seen by many as extremely weak, and the Agreement on Forest Principles was not even a treaty. Typical of the majority of comments made about the Rio agreements at the time was the following:

A watered down Convention on Climate Change, a Convention on Biodiversity weakened by the absence of the United States’ signature, and declarations of intent: this is the upshot of the two-week Rio Conference on the Environment and Development, which brought together 178 national delegations and ended on June 14 with speeches from 117 Heads of State and Government. (UNCED: Mixed Bag of Results at Rio Conference, 1992).

Furthermore, the North–South issues discussed above played an important part in explaining why these agreements were as weak as they were. As Elizabeth DeSombre notes, “Disagreement between developed and developing states led to weak language in the Declaration and *Agenda 21* that satisfied neither bloc” (DeSombre, 2006).

Accompanying the problems with content are problems of implementation. By the time of Rio Plus Five in 1997, participants in that conference were complaining that little meaningful work had been done in either implementing the international conventions signed at Rio in 1992 (or in putting *Agenda 21* into action) (Long, 2000). However, it is the responsibility of states to sign, ratify, and implement treaties within their own borders; thus in that context, it is unfair to blame the Earth Summit at Rio for the slow pace of implementing the Rio agreements. Rather, foot-dragging by certain countries, especially the United States, in relation to signing and ratifying treaties, has been a serious obstacle to progress (DeSombre, 2005, p. 187). For example, at Rio, the United States refused to sign the CBD, although it was signed later in 1993 under the Clinton Administration. And while the United States signed and ratified the UNFCCC, it never ratified the Kyoto Protocol negotiated in later years.

Still, it must be recognized that despite these problems with the content and process of the two Rio Conventions (CBD and UNFCCC), the contribution of the Rio Declaration and *Agenda 21*, particularly in relation to chemical management issues, cannot be easily dismissed. The UN Institute for Training and Research (UNITAR) states: “The legal framework of chemical safety was promoted by the Rio Declaration. Three chapters of *Agenda 21* outline action plans for the environmentally sound management of toxic chemicals and hazardous wastes as well as the associated

international legal instruments and mechanisms.”* Moreover, as UNITAR observes, before the end of the 1990s, two of the key chemical and hazardous waste management agreements, the Basel and Rotterdam Conventions, entered into force and negotiations were strongly underway on the Stockholm Convention (POPS).† Thus, it seems not unlikely that Rio played a part in fostering the enthusiasm and political work to bring those agreements to life.

Corporate Influence, Cooptation, and Minimization of Corporate Responsibility

Much has been made, from many angles, about the prominent role that business had at Rio. Many question why and how business interests were there in the first place, given the fact that apart from delegates representing their states, and intergovernmental organizations, the UN generally recognizes as official observers of the process only those groups within civil society that are recognized by the UN as NGOs. Granted, business associations formed as NGOs existed then as they do today, but the corporate lobby at Rio found a way to the table that did not always comport with observer status as traditionally known. In a critical retrospective on Rio, Neil Middleton, Phil O’Keefe, and Sam Moyo give a vivid example of how the corporate interests were treated relative to their NGO counterparts:

There was a moment in the preparatory commissions when a major Northern trade association was to be recognized while a number of the grassroots African organizations were to be excluded. That particular insanity was stopped, but it is clear that any programme in which it is necessary to fight that kind of battle is deeply flawed. (Middleton et al., 1995)

Indeed, while some authors have casted the participation of the business sector at Rio in a positive light (because business seemed ready to engage in dialogue on environmental issues) (e.g., Koh, 1997), most of the commentary has been critical and much of it has been harsh. In *The Earth Brokers: Power, Politics and World Development*, Pratap Chatterjee and Matthias Finger explain that at Rio, multinational interests lobbied UNCED negotiators hard, became respectable participants in the UNCED process, helped fund the event and ultimately conveyed the view quite successfully on many levels, that they were much more part of the solution than they were part of the problem (Chatterjee and Finger, 1995).

Similarly, Elizabeth DeSombre states:

Those who believe that true environmental protection requires a fundamental change from business-as-usual decry the extent to which the Rio Conference fully institutionalized the shift from seeing industry and wealth as the cause of environmental degradation to viewing them as the solution to environmental problems. Whatever one believes about this relationship, the conference at Rio helped to cement an international policymaking process in which industry and economic growth is central to the way environmental protection is negotiated. (DeSombre, 2006)

* UN Institute for Training and Research, at: <http://www.unitar.org/ilp/waste-management>

† Ibid.

Finally, Chatterjee and Finger, go so far as to say that “UNCED has promoted business and industry” and that, when all was said and done, it was the corporate interests that prevailed at Rio (Chatterjee and Finger, 1995). When we look at how well business interests and the corporate world have fared since 1992, in comparison with how well the environment and those living in poverty have fared, it is rather easy to admit that such conclusions are plausible, even probable.

RIO EARTH SUMMIT: LEGACY, LONG-TERM IMPACTS, AND INFLUENCE ON CURRENT AND EMERGING ISSUES

In a 2002 survey of 252 scholars and practitioners from 71 countries, almost 70 percent viewed the Earth Summit at Rio as having been “very significant” or “monumental.” Only about 6%, however, held the view that significant progress had been made on implementing Rio goals (Najam et al., 2002). The study’s primary author notes that: “The survey suggests that Rio’s greatest impact came from its indirect outputs: its success in giving a higher global profile to issues of environment and development; spurring the growth of national and international institutions, policies, projects, and multilateral agreements for environment and development; and giving more prominence to the views of developing countries on global environmental policy” (Najam, 2005, p. 229).

Certainly, the many objectives and ideals of Rio’s *Agenda 21* still inspire and influence international agreements and collaborative efforts on environmental issues, including chemical management. The *Dubai Declaration on International Chemicals Management* (2006),* for example, specifically references Chapter 19 of *Agenda 21*, which deals with the environmentally sound management of toxic chemicals.

Nonetheless, it is undeniable that Rio’s impact and its potential for continuing influence was greatly altered and limited by the establishment of the World Trade Organization (WTO) following the Marakkesh Agreement of 1994 and the ensuing interest in globalization. Martin Khor, Executive Director of the South Centre and former Director of the Third World Network, summarizes well how globalization has largely overshadowed its rival paradigm, sustainable development:

Globalisation found a new institutional house with its many rooms in the WTO’s several agreements. Moreover the WTO’s dispute settlement system based on retaliation and sanctions gave it a strong enforcement capability. The WTO agreements rivalled the chapters of Agenda 21 and the Rio Declaration. The UNCED did not have a compliance system or a strong agency for following up its agreements. As the 1990s drew on, and the WTO agreements became more and more operational, the globalisation paradigm far outstripped the sustainable development paradigm. Marakkesh 1994 overrode and undermined Rio 1992.†

* As presented in Strategic Approach to International Chemicals Management, Comprising the Dubai Declaration on International Chemicals Management, the Overarching Policy Strategy and the Global Plan of Action, issued by the Secretariat for the Strategic Approach to International Chemicals Management, June 6, 2006, pending formal publication, at: http://www.saicm.org/documents/saicm%20texts/standalone_txt.pdf

† “Globalization and the Crisis of Sustainable Development,” undated, at: www.unu.edu/interlink/papers/WG1/Khor.doc